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ABSTRACT

This instructor's guide consists of materials for use in teaching a course in technical mathematics designed for students enrolled in postsecondary vocational and technical education programs. Included in the guide are 32 units organized into the following broad topic areas: whole numbers, fractions, decimals, percentages, measures, tables and graphs, and calculators. Each unit contains some or all of the following components: a unit objective, specific performance objectives, suggested activities for the instructor, a list of references, information sheets, transparency masters, assignment sheets, a test evaluation, and test answers. (MN)

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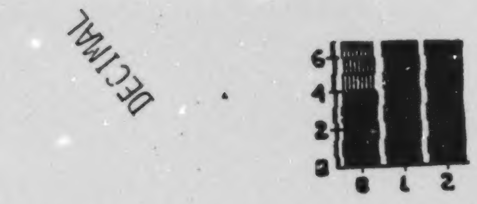
CENTIMETER
πr²
AREA
6
3
÷
SUM
MULTIPLY
+
3
6
7/3
2
2
ADDITION
WHOLE NUMBERS
4
LBS.
5x7
1

TECH MATHEMATICS

Instructor Edition


DECIMAL
6
4
2
0

1
FRACTIONS
$
8.9
QUOTIENT
METERS

POST-SECONDARY VOCATIONAL-TECHNICAL LEVEL

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AREA OF VOCATIONAL EDUCATION
COLLEGE OF EDUCATION
UNIVERSITY OF ARKANSAS
FAYETTEVILLE, ARKANSAS

TECH MATHEMATICS

by

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Black River
Northwest
Pines
Pulaski
Rich Mountain
White River

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USE OF PUBLICATION

Instructional Units

Tech Math contains 32 units. Each instructional unit includes some or all of the basic components of a unit of instruction: performance objectives, suggested activities for teachers, information sheets, assignment sheets, visual aids, tests and answers to the tests. Units are planned for more than one lesson or class period of instruction.

Careful study of each instructional unit by the teacher will help to determine:

A. The amount of material that can be covered in each class period

B. The skills which must be demonstrated
   1. Supplies needed
   2. Equipment needed
   3. Amount of practice needed
   4. Amount of class time needed for demonstrations

C. Supplementary materials such as pamphlets or filmstrips that must be ordered

D. Resource people who must be contacted

Objectives

Each unit of instruction is based on performance objectives. These objectives state the goals of the course, thus providing a sense of direction and accomplishment for the student.

Performance objectives are stated in two forms: unit objectives, stating the subject matter to be covered in a unit of instruction; and specific objectives, stating the student performance necessary to reach the unit objective.

Since the objectives of the unit provide direction for the teaching-learning process, it is important for the teacher and students to have a common understanding of the intent of the objectives. A limited number of performance terms have been used in the objectives for this curriculum to assist in promoting the effectiveness of the communication among all individuals using the materials.

Reading of the objectives by the student should be followed by a class discussion to answer any questions concerning performance requirements for each instructional unit.

Teachers should feel free to add objectives which will fit the materials to the needs of the students and community. When teachers add objectives, they should remember to supply the needed information, assignment and/or job sheets, and criterion tests.

Suggested Activities for the Instructors

Each unit of instruction has a suggested activities sheet outlining steps to follow in accomplishing specific objectives. Duties of instructors will vary according to the particular unit; however, for best use of the material they should include the following: provide students with objective sheet, information sheet, and assignment sheets; make transparencies and arrange for resource materials and people; discuss unit and specific objectives and information sheet; give test. Teachers are encouraged to use any additional instructional activities and teaching methods to aid students in accomplishing the objectives.

Information Sheets

Information sheets provide content essential for meeting the cognitive (knowledge) objectives in the unit. The teacher will find that the information sheets serve as an excellent guide for presenting the background knowledge necessary to develop the skill specified in the unit objective.

Students should read the information sheets before the information is discussed in class. Students may take additional notes on the information sheets.

Transparency Masters

Transparency masters provide information in a special way. The students may see as well as hear the materials being presented, thus reinforcing the learning process. Transparencies may present new information or they may reinforce information presented in the information sheets. They are particularly effective when identification is necessary.

Transparencies should be made and placed in the notebook where they will be immediately available for use. Transparencies direct the class's attention to the topic of discussion. They should be left on the screen only when topics shown are under discussion.

Assignment Sheets

Assignment sheets give direction to study and furnish practice for paper and pencil activities to develop the knowledges which are necessary prerequisites to skill development. These may be given to the student for completion in class or used for homework assignments. Answer sheets are provided which may be used by the student and/or teacher for checking student progress.

Test Evaluation

Paper-pencil and performance tests have been constructed to measure student achievement of each objective listed in the unit of instruction. Individual test items may be pulled out and used as a short test to determine student achievement of a particular objective. This kind of testing may be used as a daily quiz and will help the teacher spot difficulties being encountered by students in their efforts to accomplish the unit objective. Test items for objectives added by the teacher should be constructed and added to the test.

Test Answers

Test answers are provided for each unit. These may be used by the teacher and/or student for checking student achievement of the objectives.

WHOLE NUMBER WORD PROBLEMS
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to solve whole number word problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Interpret whole number word problems into number problems.
2. Use estimation as a technique to determine the reasonableness of an answer.
3. Find solutions to real-world problems involving whole numbers.

WHOLE NUMBER WORD PROBLEMS
UNIT I

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Write a number sentence for each word problem.

    2. Assignment Sheet #2--Solve problems and estimate the reasonableness of the answers.

    3. Assignment Sheet #3--Solve real-life word problems.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Aufman, Richard N. and Vernon C. Barker. Essential Mathematics. Boston, MA 02108: Houghton Mifflin Co., 1982.

B. O'Neil, Michael J. Guidebook to Mathematics. Los Angeles, CA 90039: Bowmar/Noble Publishers, Inc., 1982.

C. Shea, James T. Working With Numbers. Austin, TX 78768: Steck-Vaughn Co., 1980.

WHOLE NUMBER WORD PROBLEMS
UNIT I

INFORMATION SHEET

I. Terms and Definitions

A. Symbols

1. Add - (+)
2. Subtract - (-)
3. Multiply - (x),(·),( )( )
4. Divide - (÷)
5. Equals - (=)

B. Key words for each operation

1. Add - sum; and; increase; plus; more than; and total.

   Examples: the sum of 2 and 3; 3 and 2; increase 3 by 2; 3 plus 2; and 3 more than 2

2. Subtract - less; minus; decrease; and difference.

   Examples: 6 less 4; 6 minus 4; decrease 6 by 4; and difference between 6 and 4

3. Multiply - of; product; and times.

   Examples: 15% of 75 is 11.25; is the product of 5 and 3; and 5 times 3

4. Divide - quotient; equal parts.

   Example: the quotient of 9 and 3

5. Equals - is; are

   Examples: 20% of 40 is 8; and 3 and 6 are 9

II. Procedures for Word Problem Solution

A. Application of whole number operations to real-life word problems

1. Read the problem thoroughly and carefully.
2. Determine what you are asked to find.
3. Write all pertinent information given in the problem.
4. Write the word problem information in a number sentence.
5. Estimate a reasonable answer.
6. Solve the number sentence.
7. Check your answer for accuracy.

B. Estimation--a procedure of rounding off numbers used to determine the reasonableness of an answer to a problem

Example:

$$\begin{array}{r} 6{,}589 \\ \times\ \ 398 \\ \hline 2{,}622{,}422 \end{array} \qquad \begin{array}{rr} 6{,}589 \text{ is close to} & 7{,}000 \\ 398 \text{ is close to} & \times\ \ 400 \\ \cline{2-2} & 2{,}800{,}000 \end{array}$$

2,622,422 (the exact answer) is close enough to 2,800,000 (the estimate) to assume that the exact answer is correct.

WHOLE NUMBER WORD PROBLEMS
UNIT I

ASSIGNMENT SHEET #1

Directions: a) Write a number sentence for each problem; then b) solve each number sentence.

1. Sylvia's bills for the month were: electricity $64.04; rent $250; sanitation $15.00; telephone $26.45 and gas $27.68. What was the total amount paid for the month's bills?

2. Jim earns $26,000 a year. How much does he earn in a month?

3. Jennifer drove at a speed of 62 miles per hour for 5 hours on Monday. On Tuesday, she drove at a rate of 55 miles per hour for 4 hours. How many miles did Jennifer travel on Monday and Tuesday?

4. A train travels 54 miles per hour. How long will the train take to travel 270 miles?

5. One ticket to a variety show costs $5.75. How much will 59 tickets cost?

6. How many tickets can be bought with $69.00?(use information in problem 5)

WHOLE NUMBER WORD PROBLEMS
UNIT I

ASSIGNMENT SHEET #2

Directions: Solve the problems and estimate the reasonableness of the answer.

1. A hardware store owner paid in one year: $2665 for rent, $756 for electricity, $412 for telephone service and $598 for gas to heat the store. What was the total paid for these bills?

2. In 1960, the population of Cypress City was 498,432. In 1970 the population had increased to 602,329. What was the increase from 1960 to 1970?

3. A real estate agency sold $5,345,675 worth of real estate last year. So far this year the agency has sold $3,998,432 worth.How much more must be sold to equal last year's sales?

4. An office worker earns $7.10 per hour. How much does the worker earn in an 8-hour day?

5. An auto dealer made sales amounting to 5-day week. What was the average sales for each of the five days?

WHOLE NUMBER WORD PROBLEMS
UNIT I

ASSIGNMENT SHEET #3

Directions: Solve the following real-life problems.

1. Janice plans to attend two weeks of summer classes. She has $588 to spend for food and housing. How much does Janice have to spend for each day's food and lodging?

2. A cosmetologist gives 12 permanent waves at a cost of $7.50 each. Customers are charged $23.50 for a permanent wave.
    a) How much profit does the cosmetologist make on 1 permanent?

    b) on the 12 permanents?

3. A copy machine copies 40 copies per minute from a master. How long does it take the machine to reproduce 560 copies?

4. A painter offered to paint a house at the rate of $6.50 per hour, estimating that the job would take 40 hours. As an alternative offer the painter would do the entire job for $350. Which is the least expensive way to have the job done?

5. A seamstress needs 5 yards of fabric to make a dress. One fabric costs $7.69 per yard. What is the cost of enough fabric for the dress at this price?

How much would the seamstress save by using fabric which costs $6.50 per yard?

WHOLE NUMBER WORD PROBLEMS
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. $64.04 + $250.00 + $15.00 + $26.45 + $27.68 =
   b. $383.17

2. a. $26000 ÷ 12 =
   b. $2166.67

3. a. Monday - 62 x 5 = 310 miles
   Tuesday - 55 x 4 = 220 miles
   b. 310 + 220 = 530 miles

4. a. 270 ÷ 54 =
   b. 5 hours

5. a. $5.75 x 59 =
   b. $339.25

6. a. $69.00 ÷ $5.75 =
   b. 12 tickets

ASSIGNMENT SHEET #2

1. $2665 is close to $2700
   756 is close to 800
   412 is close to 400
   598 is close to 600
   $4431 $4500

   The exact answer $4431 is close to the estimated answer $4500; therefore it is reasonable to assume that the exact answer is correct.

2. 602,329 is close to 600,000
   498,432 is close to 500,000
   103,897 is close to 100,000

   The exact answer 103,897 is close to the estimated 100,000; therefore it is reasonable to assume that the exact answer is correct.

3. $5,345,675 is close to $5,000,000
 3,998,432 is close to 4,000,000
 $1,347,243 is close to $1,000,000

 The exact answer 1,347,243 is close to the estimated 1,000,000; therefore it is reasonable to assume that the exact answer is correct.

4. $7.10 is close to $ 7.00
 x 8 x 8
 $56.80 is close to $56.00

 The exact answer $56.80 is close to the estimated answer $56.00; therefore it is reasonable to assume that the exact answer is correct.

5. $57,232 is close to $57,000
 11,446 11,400
 5/ 57,230 is close to 5/ 57,000

 The exact answer $11,446 is close to the estimated $11,400; therefore it is reasonable to assume that the exact answer is correct.

ASSIGNMENT SHEET #3

1. $42.00
2. a) $16.00 b) $192.00
3. 14 minutes
4. $260.00 by the hour
 $350 - $260 = $90 difference
5. a) $38.45 b) $5.95

WHOLE NUMBER WORD PROBLEMS
UNIT I

TEST

1. Write number sentences for the following word problems; solve the number sentences.

   A. A load of wet sand weighs 12,480 lbs. When the sand is dry, it weighs 11,464 lbs. What is the difference in weight after drying?

   B. A store owner purchased 60 gallons of white paint, 49 gallons of blue paint and 64 gallons of yellow paint. What was the total number of gallons of paint purchased?

   C. Five bricklayers laid 4000 bricks in one day. What was each bricklayer's average for the day?

   D. An employer pays 75 employees $160 per week. How much does he pay each week for all 75 employees?

2. Solve each problem and estimate the reasonableness of your answers by rounding off the numbers used in the problems.

   A. A dealer sold 83 washing machines in a month. If the dealer made a profit of $198 on each machine, how much did he make on the 83 machines?

B. A contractor needs to move 48484 lbs. of sand to another site. A truck holds 6538 lbs. How many loads are required to move the sand?

C. A bricklayer made $1257 on one job, $2594 on another job and $3775 on a third job. What was the total made on the three jobs?

3. Solve the following problems.

A. A secretary earns $360 for working 40 hours. What is the secretary's pay for 1 hour?

B. The odometer reads 75,438 miles at the start of your trip. At the end of the trip the odometer reads 77,563 miles. Find the number of miles traveled on the trip.

C. A farmer harvested 59,265 lbs. of potatoes from one field and 65,083 lbs. from another field The potatoes were packed in bags of 25 lbs. per bag. How many bags were needed to pack the potatoes?

D. A basketball team bought 35 uniforms for $25 each. What it the total cost of the 35 uniforms?

WHOLE NUMBER WORD PROBLEMS
UNIT I

ANSWERS TO TEST

1. a. 12,480 - 11,464 = 1016 lbs
   b. 60 + 49 + 64 = 173 gallons of paint
   c. 4000 - 5 = 800 bricks on the average
   d. $160 x 75 = $12,000

2. a. Estimate $16,000; Exact answer $16,434
   b. Estimate 7 and 1 part; Exact answer 7 and 1 part
   c. Estimate 8000: Exact answer $7626

3. a. $9.00 per hour
   b. 2125 miles
   c. 59,265 lbs. + 65,083 lbs. = 124,348;
   124,348 ÷ 25 = 4973.92 or rounded to 4974 whole bags
   d. $875

FRACTION NOTATION
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to interpret fractional notation. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Identify prime numbers.
2. Factor any number into its prime number factors.
3. Raise fractions to specified higher terms.
4. Identify lowest common multiple.
5. Find the lowest common denominator of given sets of fractions.
6. Change improper fractions to whole or mixed numbers.
7. Convert mixed numbers to improper fractions.
8. Compare fractions.

FRACTION NOTATION
UNIT I

SUGGESTED ACTIVITIES

I. Make transparency.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate Sieve of Eratosthenes with transparency master.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Transparency Master--Sieve of Eratosthenes

   D. Assignment Sheets

      1. Assignmnet Sheet #1--Identify prime numbers

      2. Assignment Sheet #2--Factor any number into its prime number factors

      3. Assignment Sheet #3--Identify the lowest common multiple

      4. Assignment Sheet #4--Raise fractions to specified higher terms

      5. Assignment Sheet #5--Find the lowest common denominator of given sets of fractions

6. Assignment Sheet #6--Change improper fractions to whole or mixed numbers

7. Assignment Sheet #7--Convert mixed numbers to improper fractions

8. Assignment Sheet #8--Compare fractions

E. Answers to assignment sheets

F. Test

G. Answers to test

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1. Hobbs, Glen M. and James McKinney. Practical Mathematics. Alsip, Il 60658: American Technical Publishers, Inc., 1972.

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3. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

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FRACTION NOTATION
UNIT I

INFORMATION SHEET

I. Terms and Definitons

A. Fraction--Can represent the number of equal parts of a whole.

Example:

5	numerator
-	fraction bar
6	denominator

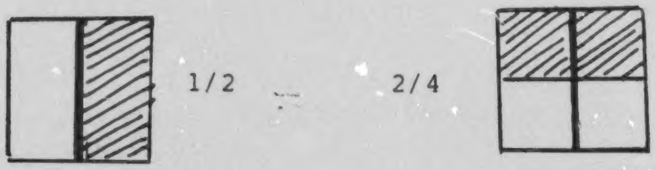
B. Proper fraction--A fraction which is less than 1, whose numerator is smaller than its denominator.

C. Improper fraction--A fraction which is more than or equal to 1 and whose numerator is larger than or equal to its denominator.

D. Mixed numbers--A number greater than 1, having a whole number part and a fractional part.

Example: In the mixed number $2\frac{1}{2}$, 2 is the whole number part and $\frac{1}{2}$ is the fractional part.

E. Equivalent fractions--Fractions which are equal in value but have unlike numerators and denominators.



F. Prime numbers--A prime number is a number larger than 1 that is evenly divisible only by itself and by 1.

Example:
2,3,5,7,11,13,17,19,23 are all prime numbers.

G. Factors--In a multiplication problem, the numbers which are multiplied together are factors.

H. Prime factorization--The prime factorization of a number is the expression of the number as a product of its prime factors.

Example: To find the prime factors of 40, use the smallest prime factor as a divisor of 40 and continue with prime numbers as trial divisors until the last quotient is a prime number.

$$\begin{array}{r} 5 \\ 2\overline{)10} \\ 2\overline{)20} \\ 2\overline{)40} \end{array}$$

the last quotient is a prime number.

I. Multiples--The multiples of a number are the products of that number and the numbers: 1,2,3,4,5,6...

J. Common multiple--A number that is a multiple of 2 or more numbers is a common multiple of those numbers.

K. Least common multiple--The smallest common multiple of 2 or more given numbers.

L. Common factor--A number which is a factor of two or more given numbers.

M. The greatest common factor--The largest factor of 2 or more numbers.

II. Procedures

A. Find the Least Common Denominator (or lowest common multiple) of a given set of fractions.

1. Factor each denominator into prime factors.
2. Write each prime factor the greatest number of times it appears in any one denominator.
3. Find the product of these prime factors from step two. This product is the least common denominator of the given set of fractions.

B. Change improper fractions to whole or mixed numbers.

1. Some improper fractions may be written as mixed numbers.

    a. Divide the numerator by the denominator.

b. Write the remainders over the divisor to form the fractional part of the mixed number.

Example:

$$\frac{12}{7} = \begin{array}{r} 1 \\ 7\overline{)12} \\ \underline{7} \\ 5 \end{array}$$

$$\frac{12}{7} = 1\,\frac{5}{7}$$

c. Write the mixed number.

2. Some improper fractions can be written as whole numbers.

a. Divide the numerator by the denominator.

Example: $\frac{15}{3} = \begin{array}{r} 5 \\ 3\overline{)15} \end{array}$

b. The remainder is 0 and the quotient is a whole number, therefore $\frac{15}{3} = 5$.

C. Change mixed numbers to improper fractions.

1. Multiply the denominator of the fractional part by the whole number part.

2. Add this product (1) to the numerator of the fractional part to obtain the new numerator for the improper fraction.

3. Write the improper fraction.

D. Factor any number into its prime number factors.

NOTE: General Rules for Factoring: If the right hand figure of any number is "0" or "2" - 2 is a factor. If the sum of figures (or digits) of a number is evenly divisible by "3", then 3 is a factor. If the right two figures of a number, when considered as a separate number, are evenly divisible by "4", then 4 is a factor. If the right hand figure of a number is "0" or "5", then 5 is a factor.

1. Write the number as the product of two or more prime numbers (other than itself and 1)
2. Study each factor. If one or more factors are numbers other than prime numbers factor again. Keep any prime factors.
3. Repeat until all factors are prime numbers.

E. Raise a fraction to specified higher terms.

1. Divide the smaller original denominator into larger specified denominator.
2. Multiply the smaller original numerator by the quotient found in step 1.
3. Write the new numerator above the denominator.

Example: $\frac{3}{4} = \frac{?}{16}$

step 1: $4\overset{4}{\overline{)16}}$

step 2: 3 x 4 = 12

step 3: $\frac{3}{4} = \frac{12}{16}$

F. Compare fractions

1. Find and specify the least common denominator.
2. Change each fraction to an equivalent fraction having the specified common denominator.
3. Compare the numerators.

2. Multiply the smaller original numerator by the quotient found in step 1.

3. Write the new numerator above the new denominator.

Example: $\frac{3}{4} = \frac{?}{16}$

step 1: $4\overline{)16}$ with quotient 4

step 2: $3 \times 4 = 12$

step 3: $\frac{3}{4} = \frac{12}{16}$

F. Compare fractions

1. Find and specify the least common denominator.

2. Change each fraction to an equivalent fraction having the specified common denominator.

3. Compare the numerators.

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #1--IDENTIFY PRIME NUMBERS

NOTE: The sieve of Eratosthenes is a method developed about 2 000 years ago by the Greek mathematician, Eratosthenes, which allows us to identify prime numbers. All that is required is the ability to count to 7, and some means of keeping track of where you are. The only limit to how far you can go is how big a piece of paper you have and how long the list of numbers is.)

Directions: Cross out numbers which are multiples of 2, 3, 5, and 7. It is not necessary to know the multiplication tables to do this.

STEPS: Using the table on the next page,

a. Cross out 1 which is not prime. Circle the next number, which is 2.

b. Starting with the number next to 2, count 1, 2, and cross out whatever number the count of 2 falls on (which will be 4, 6, 8,...).

c. Go to the next number, 3, and circle it.

d. Starting with the next number, count 1, 2, 3, and cross out whatever number the count of 3 falls on. In this way you are eliminating the multiples of 3.

e. Go to the next unmarked number (5 in this case) circle it, and repeat the process by crossing out every 5th number lager than 5.

f. Go to the next unmarked number (7 in this case) circle it and repeat the process, starting at the next number (8) and counting 1-7 and crossing out the number the count of 7 falls on.

g. Circle 11.

The circled numbers may be thought of as having passed through a sieve or strainer, and are prime. Compare some of your circled numbers with the examples of prime numbers given in section I:G of the information sheet.

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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

SIEVE OF ERATOSTHENES

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #2--FACTOR ANY NUMBER INTO ITS PRIME NUMBER FACTORS

Directions: Factor the following numbers into their prime number factors. You may use either method.

Example:

$$\begin{array}{r|l} 3 & 36 \\ \hline 3 & 12 \\ \hline 2 & 4 \\ \hline & 2 \end{array}$$

or

36

9 x 4

3x3 2x2

Prime number factors are 3,3,2 and 2.

1. 135   3. 86   3. 284   4. 385

5. 837   6. 184   7. 132   8. 108

9. 39   10. 198

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #4--RAISE FRACTIONS TO SPECIFIED HIGHER TERMS

Directions: Change the following fractions to higher terms by multiplying the numerator and denominator of each fraction by 4,2, and any number you choose.

		A	B	C
1.	$\frac{1}{2}$	$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$	$\frac{1 \times 2}{2 \times 2} = \frac{2}{4}$	$\frac{1 \times 8}{2 \times 8} = \frac{8}{16}$
2.	$\frac{2}{3}$			
3.	$\frac{5}{8}$			
4.	$\frac{6}{7}$			
5.	$\frac{1}{3}$			
6.	$\frac{7}{10}$			

	A	B	C
7. $\frac{4}{9}$			
8. $\frac{3}{8}$			
9. $\frac{3}{16}$			
10. $\frac{5}{7}$			
11. $\frac{2}{9}$			

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #5--FIND THE LOWEST COMMON DENOMINATOR OF GIVEN SETS OF FRACTIONS

Directions: Find the lowest common denominator of each set of fractions. Place your answer in the blank.

1\.

______a. $\frac{2}{3}$; $\frac{5}{6}$; $\frac{7}{9}$

______b. $\frac{7}{5}$; $\frac{2}{3}$

______c. $\frac{2}{7}$; $\frac{3}{4}$; $\frac{1}{3}$

______d. $\frac{2}{3}$; $\frac{5}{8}$; $\frac{7}{12}$

______e. $\frac{5}{8}$; $\frac{5}{6}$

______f. $\frac{4}{5}$; $\frac{3}{4}$

______g. $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$

______h. $\frac{5}{9}$; $\frac{7}{16}$

______i. $\frac{7}{12}$; $\frac{5}{8}$; $\frac{2}{3}$; $\frac{5}{6}$

______j. $\frac{8}{9}$; $\frac{5}{8}$

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #6--CHANGE IMPROPER FRACTIONS TO WHOLE OR MIXED NUMBERS

Directions: Change the following improper fractions to whole or mixed numbers. Place your answer in the blank.

1.

__________a. $\frac{15}{5}$

__________b. $\frac{21}{6}$

__________c. $\frac{9}{4}$

__________d. $\frac{3}{3}$

__________e. $\frac{6}{2}$

__________f. $\frac{27}{5}$

__________g. $\frac{13}{7}$

__________h. $\frac{31}{6}$

__________i. $\frac{27}{26}$

__________j. $\frac{11}{4}$

__________k. $\frac{123}{25}$

__________l. $\frac{25}{3}$

__________m. $\frac{101}{100}$

__________n. $\frac{7}{4}$

__________c. $\frac{8}{6}$

__________p. $\frac{21}{3}$

__________q. $\frac{36}{2}$

__________r. $\frac{9}{3}$

__________s. $\frac{10}{4}$

__________t. $\frac{3}{2}$

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #7--CONVERT MIXED NUMBERS TO IMPROPER FRACTIONS

Directions: Change the following mixed numbers to improper fractions. Place your answer in the blank.

1.

__________a. $2\frac{2}{3}$

__________b. $9\frac{3}{5}$

__________c. $20\frac{1}{2}$

__________d. $15\frac{2}{6}$

__________e. $2\frac{3}{20}$

__________f. $34\frac{5}{6}$

__________g. $12\frac{5}{8}$

__________h. $2\frac{1}{2}$

__________i. $4\frac{1}{7}$

__________j. $3\frac{2}{7}$

__________k. $5\frac{2}{3}$

__________l. $8\frac{1}{2}$

__________m. $3\frac{1}{6}$

__________n. $8\frac{4}{5}$

__________o. $18\frac{1}{6}$

__________p. $9\frac{2}{\text{[illegible]}}$

__________q. $21\frac{1}{2}$

__________r. $10\frac{5}{8}$

__________s. $5\frac{6}{11}$

__________t. $13\frac{1}{3}$

FRACTION NOTATION
UNIT I

ASSIGNMENT SHEET #8--COMPARE FRACTIONS

Directions: Compare the following pairs of fractions using < and > . Place the sign in the blank.

a. $\frac{5}{6}$ ___ $\frac{2}{6}$

b. $\frac{5}{9}$ ___ $\frac{5}{7}$

c. $\frac{7}{8}$ ___ $\frac{8}{9}$

d. $\frac{7}{11}$ ___ $\frac{9}{10}$

e. $\frac{3}{5}$ ___ $\frac{2}{3}$

f. $\frac{1}{2}$ ___ $\frac{7}{16}$

g. $\frac{15}{64}$ ___ $\frac{3}{16}$

h. $\frac{3}{4}$ ___ $\frac{2}{3}$

i. $\frac{3}{8}$ ___ $\frac{4}{8}$

j. $\frac{7}{64}$ ___ $\frac{1}{4}$

k. $\frac{9}{19}$ ___ $\frac{1}{2}$

l. $\frac{3}{7}$ ___ $\frac{1}{9}$

m. $\frac{5}{8}$ ___ $\frac{11}{16}$

n. $\frac{3}{16}$ ___ $\frac{11}{16}$

o. $\frac{8}{20}$ ___ $\frac{8}{12}$

FRACTION NOTATION
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

~~1~~	②	③	~~4~~	⑤	~~6~~	⑦	~~8~~	~~9~~	~~10~~
⑪	~~12~~	⑬	~~14~~	~~15~~	~~16~~	⑰	~~18~~	⑲	~~20~~
~~21~~	~~22~~	㉓	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	㉙	~~30~~
㉛	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	㊲	~~38~~	~~39~~	~~40~~
㊶	~~42~~	㊸	~~44~~	~~45~~	~~46~~	㊼	~~48~~	~~49~~	~~50~~
~~51~~	~~52~~	(53)	~~54~~	~~55~~	~~56~~	~~57~~	~~58~~	(59)	~~60~~
(61)	~~62~~	~~63~~	~~64~~	~~65~~	~~66~~	(67)	~~68~~	~~69~~	~~70~~
(71)	~~72~~	(73)	~~74~~	~~75~~	~~76~~	~~77~~	~~78~~	(79)	~~80~~
~~81~~	~~82~~	(83)	~~84~~	~~85~~	~~86~~	~~87~~	~~88~~	(89)	~~90~~
~~91~~	~~92~~	~~93~~	~~94~~	~~95~~	~~96~~	(97)	~~98~~	~~99~~	~~100~~

ASSIGNMENT SHEET #2

1. 3,3,3,5
2. 2,43
3. 2,2,71
4. 5,7,11
5. 3,3,3,31
6. 2,2,2,23
7. 2,2,3,11
8. 2,2,3,3,3
9. 3,13
10. 2,3,3,11

ASSIGNMENT SHEET #3

1. a. 6 b. 24 c. 30 d. 28
e. 30 f. 240 g. 60 h. 840
i. 60 j. 40

ASSIGNMENT SHEET #4

1.	A	B	C
1.	$\frac{4}{8}$	$\frac{2}{4}$	answers will vary
2.	$\frac{8}{12}$	$\frac{4}{6}$	"
3.	$\frac{20}{32}$	$\frac{10}{16}$	"
4.	$\frac{24}{28}$	$\frac{12}{14}$	"
5.	$\frac{4}{12}$	$\frac{2}{6}$	"
6.	$\frac{28}{40}$	$\frac{14}{20}$	"
7.	$\frac{16}{36}$	$\frac{8}{18}$	"
8.	$\frac{12}{32}$	$\frac{6}{16}$	"
9.	$\frac{12}{64}$	$\frac{6}{32}$	"
10.	$\frac{20}{28}$	$\frac{10}{14}$	"
11.	$\frac{8}{36}$	$\frac{4}{18}$	"

ASSIGNMENT SHEET #5

1.
a. 18
b. 15
c. 84
d. 24
e. 24
f. 20
g. 12
h. 144
i. 24
j. 72

ASSIGNMENT SHEET #6

1.
a. 3
b. $3\frac{1}{2}$
c. $2\frac{1}{4}$
d. 1
e. 3
f. $5\frac{2}{5}$
g. $1\frac{6}{7}$
h. $5\frac{1}{6}$
i. $1\frac{1}{26}$
j. $2\frac{3}{4}$
k. $4\frac{23}{25}$
l. $8\frac{1}{3}$
m. $1\frac{1}{100}$
n. $1\frac{3}{4}$
o. $1\frac{1}{3}$
p. 7
q. 18
r. 3
s. $2\frac{1}{2}$
t. $1\frac{1}{2}$

ASSIGNMENT SHEET #7

1\.

a. $\frac{8}{3}$

b. $\frac{48}{5}$

c. $\frac{41}{2}$

d. $\frac{92}{6}$

e. $\frac{43}{20}$

f. $\frac{209}{6}$

g. $\frac{101}{8}$

h. $\frac{5}{2}$

i. $\frac{29}{7}$

j. $\frac{23}{7}$

k. $\frac{17}{3}$

l. $\frac{17}{2}$

m. $\frac{19}{6}$

n. $\frac{44}{5}$

o. $\frac{109}{6}$

p. $\frac{29}{3}$

q. $\frac{43}{2}$

r. $\frac{85}{8}$

s. $\frac{61}{11}$

t. $\frac{40}{3}$

ASSIGNMENT SHEET #8

1\.

a. >

b. <

c. <

d. <

e. <

f. >

g. >

h. >

i. <

j. <

k. <

l. >

m. <

n. <

o. <

FRACTION NOTATION
UNIT I

TEST

1. Which of these numbers are prime? Circle the prime numbers.

   2, 16, 5, 97, 19, 15, 23, 13, 7, 9, 11

2. Factor the following numbers.

   a. 125 b. 86

   c. 96 d. 154

3. Raise the fractions to higher terms.

   a. $\frac{3}{5}$ b. $\frac{7}{8}$

   c. $\frac{2}{3}$ d. $\frac{5}{7}$

4. The lowest common multiple can be used as

   ____.

5. What is the lowest common denominator of each set of fractions.

_______a. $\frac{21}{24}, \frac{2}{6}, \frac{3}{4}$ _______c. $\frac{2}{15}, \frac{3}{5}, \frac{7}{30}$

_______b. $\frac{5}{20}, \frac{3}{10}, \frac{2}{5}$ _______d. $\frac{5}{12}, \frac{3}{4}$

6. Change to improper fractions.

   a. $3\frac{2}{6}$ b. $7\frac{4}{8}$

   c. $9\frac{2}{3}$ d. $8\frac{5}{6}$

7. Change to whole or mixed numbers.

a. $\frac{26}{5}$ b. $\frac{56}{7}$

c. $\frac{182}{9}$ d. $\frac{301}{6}$

8. Using =, <, or >, compare the following fractions. Place your answer in the blank.

a. $\frac{5}{6}$ ____ $\frac{3}{4}$ b. $\frac{3}{4}$ ____ $\frac{7}{8}$

c. $\frac{5}{8}$ ____ $\frac{1}{2}$ d. $\frac{1}{2}$ ____ $\frac{2}{4}$

FRACTION NOTATION
UNIT I

ANSWERS TO TEST

1. 2, 5, 97, 19, 23, 13, 7, 11

2. a. 5,5,5 b. 2, 43
   c. 3,2,2,2,2,2 d. 2,7,11

3. Answers will vary

4. Lowest common denominator

5. a. 24 b. 20
   c. 30 d. 12

6. a. $\frac{20}{6}$ b. $\frac{60}{8}$
   c. $\frac{29}{3}$ d. $\frac{53}{6}$

7. a. $5\frac{1}{5}$ b. 8
   c. $20\frac{2}{9}$ d. $50\frac{1}{6}$

8. a. $>$ b. $<$
   c. $>$ d. $=$

ADDITION OF FRACTIONS
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to add fractions. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Add fractions with unlike denominators.
2. Add whole numbers and fractions.
3. Add mixed numbers.

ADDITION OF FRACTIONS
UNIT II

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets
    - 1. Assignment Sheet #1--Add fractions with unlike denominators
    - 2. Assignment Sheet #2--Add whole numbers and fractions
    - 3. Assignment Sheet #3--Add mixed numbers
- D. Answers to assignment sheets
- E. Test
- F. Answers to test

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ADDITION OF FRACTIONS
UNIT II

INFORMATION SHEET

I. Add fractions with unlike denominators

   A. Specify the least common denominator for a given set of unlike fractions.

   B. Using the specified common denominator for all, write the equivalent fraction of each of the given set.

II. Add whole numbers and fractions.

   A. Add a whole number and a fraction.

   Example:

$$\begin{array}{r} 3 \\ +\ \frac{4}{5} \\ \hline 3\ \frac{4}{5} \end{array}$$

   B. Add a whole number and a mixed number.

      1. Add the whole numbers

      2. Write the fraction in the sum

      Example:

$$\begin{array}{r} 3\ \frac{3}{4} \\ +2\phantom{\ \frac{3}{4}} \\ \hline 5\ \frac{3}{4} \end{array}$$

III. Add mixed numbers

   A. Add mixed numbers in which the denominators of the fractional parts are alike. Add the fractional parts first, then add the whole numbers. Reduce to lowest terms when necessary.

   Example:

$$\begin{array}{r} 8\ \frac{2}{5} \\ +5\ \frac{4}{5} \\ \hline 13\ \frac{6}{5} \end{array} = 14\ \frac{1}{5}$$

B. Add mixed numbers in which the denominators of the fractional parts are not alike.

1. Find and specify the lowest common denominator for the fractional parts of the addends.
2. Change each fraction in the addends to its equivalent fraction, using the specified common denominator from #1.
3. Add the fractional parts.
4. Add the whole numbers.
5. Reduce the sum to lowest terms when necessary.

ADDITION OF FRACTIONS
UNIT II

ASSIGNMENT SHEET #1--ADD FRACTIONS WITH UNLIKE DENOMINATORS

Directions: Add and simplify if possible.

a. $\begin{array}{r} \frac{3}{8} \\ +\frac{5}{6} \\ \hline \end{array}$
b. $\begin{array}{r} \frac{2}{3} \\ +\frac{12}{15} \\ \hline \end{array}$
c. $\begin{array}{r} \frac{9}{16} \\ +\frac{3}{8} \\ \hline \end{array}$
d. $\begin{array}{r} \frac{2}{3} \\ +\frac{3}{5} \\ \hline \end{array}$

e. $\begin{array}{r} \frac{3}{7} \\ +\frac{1}{9} \\ \hline \end{array}$
f. $\begin{array}{r} \frac{1}{2} \\ +\frac{9}{19} \\ \hline \end{array}$
g. $\begin{array}{r} \frac{5}{8} \\ +\frac{11}{16} \\ \hline \end{array}$
h. $\begin{array}{r} \frac{7}{12} \\ +\frac{9}{16} \\ \hline \end{array}$

i. $\begin{array}{r} \frac{3}{8} \\ +\frac{5}{6} \\ \hline \end{array}$
j. $\begin{array}{r} \frac{5}{12} \\ +\frac{3}{6} \\ \hline \end{array}$
k. $\begin{array}{r} \frac{1}{18} \\ +\frac{3}{24} \\ \hline \end{array}$
l. $\begin{array}{r} \frac{2}{3} \\ +\frac{5}{9} \\ \hline \end{array}$

m. $\begin{array}{r} \frac{4}{5} \\ +\frac{2}{7} \\ \hline \end{array}$
n. $\begin{array}{r} \frac{2}{3} \\ +\frac{7}{8} \\ \hline \end{array}$
o. $\begin{array}{r} \frac{1}{2} \\ +\frac{7}{16} \\ \hline \end{array}$
p. $\begin{array}{r} \frac{4}{5} \\ +\frac{9}{10} \\ \hline \end{array}$

ADDITION OF FRACTIONS
UNIT II

ASSIGNMENT SHEET #2--ADD WHOLE NUMBERS AND FRACTIONS

Directions: Add.

a. $$\begin{array}{r} 5 \\ + \frac{2}{3} \\ \hline \end{array}$$

b. $$\begin{array}{r} 8 \\ + \frac{5}{8} \\ \hline \end{array}$$

c. $$\begin{array}{r} \frac{1}{2} \\ +6 \\ \hline \end{array}$$

d. $$\begin{array}{r} \frac{3}{8} \\ +22 \\ \hline \end{array}$$

e. $$\begin{array}{r} \frac{5}{21} \\ +101 \\ \hline \end{array}$$

f. $$\begin{array}{r} 252 \\ + \frac{25}{32} \\ \hline \end{array}$$

g. $$\begin{array}{r} \frac{8}{79} \\ +81 \\ \hline \end{array}$$

h. $$\begin{array}{r} 91 \\ + \frac{82}{83} \\ \hline \end{array}$$

i. $$\begin{array}{r} 9{,}862 \\ + \frac{1}{2} \\ \hline \end{array}$$

j. $$\begin{array}{r} \frac{107}{1000} \\ +99 \\ \hline \end{array}$$

ADDITION OF FRACTIONS
UNIT II

ASSIGNMENT SHEET #3--ADD MIXED NUMBERS

Driections: Add and simplify if necessary.

a. $\begin{array}{r} 5\frac{3}{4} \\ +3\frac{5}{8} \\ \hline \end{array}$

b. $\begin{array}{r} 3\frac{2}{5} \\ +20\frac{1}{5} \\ \hline \end{array}$

c. $\begin{array}{r} 23\frac{21}{25} \\ +56\frac{7}{5} \\ \hline \end{array}$

d. $\begin{array}{r} 105\frac{7}{8} \\ +25\frac{1}{2} \\ \hline \end{array}$

e. $\begin{array}{r} 3\frac{26}{100} \\ +13\frac{21}{100} \\ \hline \end{array}$

f. $\begin{array}{r} 61\frac{2}{3} \\ +2\frac{3}{4} \\ \hline \end{array}$

g. $\begin{array}{r} 33\frac{2}{3} \\ +16\frac{5}{21} \\ \hline \end{array}$

h. $\begin{array}{r} 1001\frac{25}{46} \\ +201\frac{5}{24} \\ \hline \end{array}$

i. $\begin{array}{r} 83\frac{9}{72} \\ +2\frac{1}{8} \\ \hline \end{array}$

j. $\begin{array}{r} 92\frac{5}{8} \\ +1\frac{3}{16} \\ \hline \end{array}$

k. $\begin{array}{r} 20\frac{2}{3} \\ +5\frac{3}{8} \\ \hline \end{array}$

l. $\begin{array}{r} 16\frac{2}{21} \\ +2\frac{2}{7} \\ \hline \end{array}$

m. $\begin{array}{r} 6\frac{8}{15} \\ +3\frac{2}{20} \\ \hline \end{array}$

n. $\begin{array}{r} 7\frac{31}{50} \\ +15\frac{7}{100} \\ \hline \end{array}$

o. $\begin{array}{r} 160\frac{1}{2} \\ +17\frac{1}{2} \\ \hline \end{array}$

p. $\begin{array}{r} 53\frac{12}{15} \\ +40\frac{3}{30} \\ \hline \end{array}$

q. $\begin{array}{r} 2\frac{7}{8} \\ +3\frac{3}{16} \\ \hline \end{array}$

r. $\begin{array}{r} 5\frac{11}{13} \\ +4\frac{5}{26} \\ \hline \end{array}$

ADDITION OF FRACTIONS
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. $1\frac{5}{24}$ b. $1\frac{7}{15}$ c. $\frac{15}{16}$ d. $1\frac{4}{15}$

e. $\frac{34}{63}$ f. $\frac{37}{38}$ g. $1\frac{5}{16}$ h. $1\frac{7}{48}$

i. $1\frac{5}{24}$ j. $\frac{11}{12}$ k. $\frac{13}{72}$ l. $1\frac{2}{9}$

m. $1\frac{3}{35}$ n. $1\frac{13}{24}$ o. $\frac{15}{16}$ p. $1\frac{7}{10}$

ASSIGNMENT SHEET #2

1. a. $5\frac{2}{3}$ b. $8\frac{5}{8}$ c. $6\frac{1}{2}$ d. $22\frac{3}{8}$

e. $101\frac{5}{21}$ f. $252\frac{25}{32}$ g. $81\frac{8}{79}$ h. $91\frac{82}{83}$

i. 9,862 $\frac{1}{2}$ j. $99\frac{107}{1000}$

ASSIGNMENT SHEET #3

1. a. $9\frac{3}{8}$ b. $23\frac{3}{5}$ c. $81\frac{6}{25}$

d. $131\frac{3}{8}$ e. $16\frac{47}{100}$ f. $64\frac{5}{12}$

g. $49\frac{19}{21}$ h. $1202\frac{415}{552}$ i. $85\frac{1}{4}$

j. $93\frac{13}{16}$ k. $26\frac{1}{24}$ l. $18\frac{8}{21}$

m. $9\frac{19}{30}$ n. $22\frac{69}{100}$ o. 178

p. $93\frac{9}{10}$ q. $6\frac{1}{16}$ r. $10\frac{1}{26}$

ADDITION OF FRACTIONS
UNIT II

TEST

Directions: Add, simplify if possible.

1. a. $\frac{2}{30} + \frac{12}{15}$

   b. $\frac{5}{8} + \frac{11}{16}$

   c. $\frac{1}{2} + \frac{9}{19}$

   d. $\frac{1}{20} + \frac{3}{40}$

   e. $\frac{4}{5} + \frac{9}{10}$

   f. $\frac{2}{3} + \frac{3}{5}$

2. a. $8 + \frac{5}{8}$

   b. $\frac{107}{100} + 99$

   c. $5 + \frac{2}{3}$

   d. $83 + 7\frac{2}{3}$

   e. $\frac{5}{21} + 101$

   f. $6 + 32\frac{2}{31}$

3. a. $61\frac{2}{3} + 2\frac{3}{4}$

   b. $33\frac{2}{3} + 16\frac{5}{21}$

c. $\begin{array}{r} 20\ \frac{2}{3} \\ +\ 5\ \frac{3}{8} \\ \hline \end{array}$

d. $\begin{array}{r} 3\ \frac{2}{5} \\ +20\ \frac{1}{5} \\ \hline \end{array}$

e. $\begin{array}{r} 5\ \frac{11}{13} \\ +4\ \frac{5}{26} \\ \hline \end{array}$

f. $\begin{array}{r} 92\ \frac{5}{8} \\ +\ 1\ \frac{3}{16} \\ \hline \end{array}$

g. $\begin{array}{r} 2\ \frac{1}{4} \\ +3\ \frac{2}{3} \\ \hline \end{array}$

h. $\begin{array}{r} 5\ \frac{1}{4} \\ +2\ \frac{1}{2} \\ \hline \end{array}$

ADDITION OF FRACTIONS
UNIT II

ANSWERS TO TEST

1. a. $\frac{13}{15}$
b. $1\frac{5}{16}$
c. $\frac{37}{38}$
d. $\frac{1}{8}$
e. $1\frac{7}{10}$
f. $1\frac{4}{15}$

2. a. $8\frac{5}{8}$
b. $100\frac{7}{100}$
c. $5\frac{2}{3}$
d. $90\frac{2}{3}$
e. $101\frac{5}{21}$
f. $38\frac{2}{31}$

3. a. $64\frac{5}{12}$
b. $49\frac{19}{21}$
c. $26\frac{1}{24}$
d. $23\frac{3}{5}$
e. $10\frac{1}{26}$
f. $93\frac{13}{16}$
g. $5\frac{11}{12}$
h. $7\frac{3}{4}$

SUBTRACTION OF FRACTIONS
UNIT III

UNIT OBJECTIVE

After completion of this unit, the student should be able to subtract fractions. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Subtract fractions with unlike denominators.
2. Subtract fractions from whole numbers.
3. Subtract fractions when borrowing is required.

SUBTRACTION OF FRACTIONS
UNIT III

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information Sheet

  C. Assignment Sheets

    1. Assignment Sheet #1--Subtract fractions with unlike denominators

    2. Assignment Sheet #2--Subtract fractions from whole numbers

    3. Assignment Sheet #3--Subtract fractions when borrowing is required

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop,CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ________________. Mathematics Skill Book 6600. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Company, 1983.

SUBTRACTION OF FRACTIONS
UNIT III

INFORMATION SHEET

I. Subtract fractions with unlike denominators.

A. Find the common denominator for the denominators of the given fractions.

B. Using the common denominator for each fraction, write the equivalent fraction for each fraction in the problem.

C. Subtract the numerator of the lower or bottom fraction from the top or upper numerator.

D. Reduce answer to lowest terms if necessary.

II. Subtract fractions from whole numbers.

A. Borrow 1 from the whole number and write it as a fraction with the same denominator as the fraction in the problem.

B. Subtract the fraction in the problem from the fraction borrowed from the whole number.

C. Place the whole number left in the whole number place in the answer.

Example:

$$\begin{array}{r} 5\ \cancel{6}\ \frac{3}{3} \\ -\ \ \frac{2}{3} \\ \hline \end{array}$$

borrow 1 from 6, change the borrowed 1 to $\frac{3}{3}$, and place it in the fractions column. Subtract the original fraction ($\frac{2}{3}$) from the borrowed 1 ($\frac{3}{3}$). Then place the remaining whole number in the whole numbers place in the answer.

III. Subtract fractions with borrowing.

A. Find the common denominator if fractions are unlike

Example: $$\begin{array}{r} 6\frac{3}{4} \\ -3\frac{7}{8} \\ \hline \end{array}$$ The common denominator for 4 and 8 is 8.

B. Write each fraction's equivalent using new or common denominator.

Example: $$\begin{array}{rcr} 6\frac{3}{4} & = & 6\frac{6}{8} \\ -\ 3\frac{7}{8} & & -3\frac{7}{8} \\ \hline \end{array}$$

C. Borrow 1 from the top whole number (minuend) and change it to its equivalent of 1, using the common denominator.

Example: $$6\frac{6}{8} - 1 = 5\frac{6}{8}$$

$$1 = \frac{8}{8}$$

D. Add the new equivalent of 1 to the fraction in the minuend.

Example: $$5\frac{6}{8} + \frac{8}{8} = \begin{array}{r} 5\ \frac{14}{8} \\ -3\ \ \frac{7}{8} \\ \hline \end{array}$$

E. Subtract the fractions.

F. Subtract the whole numbers.

Example: $$\begin{array}{r} 5\ \frac{14}{8} \\ -3\ \ \frac{7}{8} \\ \hline 2\ \ \frac{7}{8} \end{array}$$

G. Reduce to lowest terms when necessary.

SUBTRACTION OF FRACTIONS
UNIT III

ASSIGNMENT SHEET #1--SUBTRACT FRACTIONS WITH UNLIKE DENOMINATORS

Directions: Subtract and reduce to the lowest terms if possible.

1. a. $\begin{array}{r} \frac{5}{6} \\ - \frac{2}{12} \\ \hline \end{array}$ b. $\begin{array}{r} 8\frac{2}{3} \\ -5\frac{1}{5} \\ \hline \end{array}$ c. $\begin{array}{r} 15\frac{5}{6} \\ -10\frac{1}{3} \\ \hline \end{array}$ d. $\begin{array}{r} 16\frac{3}{4} \\ -2\frac{2}{3} \\ \hline \end{array}$

e. $\begin{array}{r} \frac{5}{8} \\ - \frac{1}{2} \\ \hline \end{array}$ f. $\begin{array}{r} \frac{3}{4} \\ - \frac{1}{3} \\ \hline \end{array}$ g. $\begin{array}{r} 5\frac{9}{8} \\ - \frac{3}{32} \\ \hline \end{array}$ h. $\begin{array}{r} \frac{32}{35} \\ - \frac{11}{70} \\ \hline \end{array}$

i. $\begin{array}{r} \frac{4}{5} \\ - \frac{1}{4} \\ \hline \end{array}$ j. $\begin{array}{r} \frac{5}{8} \\ - \frac{1}{4} \\ \hline \end{array}$ k. $\begin{array}{r} \frac{23}{31} \\ - \frac{19}{93} \\ \hline \end{array}$ l. $\begin{array}{r} 5\frac{7}{8} \\ -1\frac{2}{3} \\ \hline \end{array}$

m. $\begin{array}{r} \frac{14}{32} \\ - \frac{3}{8} \\ \hline \end{array}$ n. $\begin{array}{r} \frac{3}{8} \\ - \frac{1}{5} \\ \hline \end{array}$ o. $\begin{array}{r} \frac{1}{2} \\ - \frac{3}{8} \\ \hline \end{array}$ p. $\begin{array}{r} \frac{1}{2} \\ - \frac{3}{7} \\ \hline \end{array}$

q. $\begin{array}{r} \frac{57}{100} \\ - \frac{24}{50} \\ \hline \end{array}$ r. $\begin{array}{r} \frac{5}{7} \\ - \frac{7}{49} \\ \hline \end{array}$ s. $\begin{array}{r} \frac{5}{6} \\ - \frac{5}{7} \\ \hline \end{array}$ t. $\begin{array}{r} 25\frac{7}{8} \\ - 3\frac{2}{9} \\ \hline \end{array}$

SUBTRACTION OF FRACTIONS
UNIT III

ASSIGNMENT SHEET #2--SUBTRACT FRACTIONS FROM WHOLE NUMBERS

Directions: Subtract.

1. a. $5 - \frac{2}{3}$ b. $7 - \frac{11}{12}$ c. $23 - \frac{23}{28}$ d. $10 - \frac{1}{2}$

e. $101 - \frac{3}{4}$ f. $98 - \frac{21}{36}$ g. $25 - \frac{5}{12}$ h. $5 - \frac{5}{8}$

i. $26 - \frac{1}{3}$ j. $2 - \frac{97}{100}$ k. $128 - \frac{7}{12}$ l. $13 - \frac{6}{7}$

m. $18 - \frac{1}{3}$ n. $12 - \frac{3}{10}$ o. $16 - \frac{1}{12}$ p. $15 - \frac{5}{6}$

q $26 - \frac{5}{6}$ r. $27 - \frac{1}{8}$ s. $20 - \frac{7}{8}$ t. $21 - \frac{4}{5}$

SUBTRACTION OF FRACTIONS
UNIT III

ASSIGNMENT SHEET #2--SUBTRACT FRACTIONS FROM WHOLE NUMBERS

Directions: Subtract.

1. a. $5 - \frac{2}{3}$

b. $7 - \frac{11}{12}$

c. $23 - \frac{23}{28}$

d. $10 - \frac{1}{2}$

e. $101 - \frac{3}{4}$

f. $98 - \frac{21}{36}$

g. $25 - \frac{5}{12}$

h. $5 - \frac{5}{8}$

i. $26 - \frac{1}{3}$

j. $2 - \frac{97}{100}$

k. $128 - \frac{7}{12}$

l. $13 - \frac{6}{7}$

m. $18 - \frac{1}{3}$

n. $12 - \frac{3}{10}$

o. $16 - \frac{1}{12}$

p. $15 - \frac{5}{6}$

q $26 - \frac{5}{6}$

r. $27 - \frac{1}{8}$

s. $20 - \frac{7}{8}$

t. $21 - \frac{4}{5}$

SUBTRACTION OF FRACTIONS
UNIT III

ASSIGNMENT SHEET #3--SUBTRACT FRACTIONS WHEN BORROWING IS REQUIRED

Directions: Subtract and reduce the difference to lowest terms.

1. a. $\begin{array}{r} 14\frac{1}{2} \\ -6\frac{2}{3} \\ \hline \end{array}$ b. $\begin{array}{r} 7\frac{1}{5} \\ -2\frac{1}{4} \\ \hline \end{array}$ c. $\begin{array}{r} 6\frac{1}{5} \\ -3\frac{1}{3} \\ \hline \end{array}$

d. $\begin{array}{r} 11\frac{2}{3} \\ -8\frac{3}{4} \\ \hline \end{array}$ e. $\begin{array}{r} 15\frac{2}{5} \\ -3\frac{1}{2} \\ \hline \end{array}$ f. $\begin{array}{r} 23\frac{1}{4} \\ -14\frac{2}{3} \\ \hline \end{array}$

g. $\begin{array}{r} 14\frac{1}{3} \\ -6\frac{1}{2} \\ \hline \end{array}$ h. $\begin{array}{r} 7\frac{1}{5} \\ -2\frac{1}{2} \\ \hline \end{array}$ i. $\begin{array}{r} 11\frac{1}{5} \\ -3\frac{1}{4} \\ \hline \end{array}$

j. $\begin{array}{r} 5\frac{1}{5} \\ -3\frac{1}{4} \\ \hline \end{array}$ k. $\begin{array}{r} 9\frac{1}{4} \\ -6\frac{1}{3} \\ \hline \end{array}$ l. $\begin{array}{r} 7\frac{2}{3} \\ -4\frac{4}{5} \\ \hline \end{array}$

m. $\begin{array}{r} 16\frac{1}{8} \\ -9\frac{1}{4} \\ \hline \end{array}$ n. $\begin{array}{r} 14\frac{1}{6} \\ -11\frac{1}{3} \\ \hline \end{array}$ o. $\begin{array}{r} 8\frac{1}{3} \\ -4\frac{1}{2} \\ \hline \end{array}$

SUBTRACTION OF FRACTIONS
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. $\frac{2}{3}$ b. $3\frac{7}{15}$ c. $5\frac{1}{2}$ d. $14\frac{1}{12}$
e. $\frac{1}{8}$ f. $\frac{5}{12}$ g. $6\frac{1}{32}$ h. $\frac{53}{70}$
i. $\frac{11}{20}$ j. $\frac{3}{8}$ k. $\frac{50}{93}$ l. $4\frac{5}{24}$
m. $\frac{1}{16}$ n. $\frac{7}{40}$ o. $\frac{1}{8}$ p. $\frac{1}{14}$
q. $\frac{49}{100}$ r. $\frac{28}{49}$ s. $\frac{5}{42}$ t. $22\frac{45}{72}$

ASSIGNMENT SHEET #2

2. a. $4\frac{1}{3}$ b. $6\frac{1}{12}$ c. $22\frac{5}{28}$ d. $9\frac{1}{2}$
e. $100\frac{1}{4}$ f. $97\frac{15}{36}$ g. $24\frac{7}{12}$ h. $4\frac{3}{8}$
i. $25\frac{2}{3}$ j. $1\frac{3}{100}$ k. $127\frac{5}{12}$ l. $12\frac{1}{7}$
m. $17\frac{2}{3}$ n. $11\frac{7}{10}$ o. $15\frac{11}{12}$ p. $14\frac{1}{6}$
q. $25\frac{1}{6}$ r. $26\frac{7}{8}$ s. $19\frac{1}{8}$ t. $20\frac{1}{5}$

ASSIGNMENT SHEET #3

3. a. $7\frac{5}{6}$ b. $4\frac{19}{20}$ c. $2\frac{13}{15}$
d. $2\frac{11}{12}$ e. $11\frac{9}{10}$ f. $8\frac{7}{12}$
g. $7\frac{5}{6}$ h. $4\frac{7}{10}$ i. $7\frac{19}{20}$
j. $1\frac{19}{20}$ k. $2\frac{11}{12}$ l. $2\frac{13}{15}$
m. $6\frac{7}{8}$ n. $2\frac{5}{6}$ o. $3\frac{5}{6}$

SUBTRACTION OF FRACTIONS
UNIT III

TEST

Subtract; simplify if possible

1. a. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{2}{12} \\ \hline \end{array}$ b. $\begin{array}{r} \frac{3}{4} \\ -\ \frac{1}{3} \\ \hline \end{array}$ c. $\begin{array}{r} \frac{3}{8} \\ -\ \frac{1}{5} \\ \hline \end{array}$ d. $\begin{array}{r} \frac{5}{8} \\ -\ \frac{1}{4} \\ \hline \end{array}$

2. a. $\begin{array}{r} 5 \\ -\ \frac{2}{3} \\ \hline \end{array}$ b. $\begin{array}{r} 98 \\ -\ \frac{21}{36} \\ \hline \end{array}$ c. $\begin{array}{r} 101 \\ -\ \frac{3}{4} \\ \hline \end{array}$

d. $\begin{array}{r} 16 \\ -\ \frac{1}{12} \\ \hline \end{array}$ e. $\begin{array}{r} 7 \\ -\ \frac{11}{12} \\ \hline \end{array}$ f. $\begin{array}{r} 128 \\ -\ \frac{7}{12} \\ \hline \end{array}$

g. $\begin{array}{r} 26 \\ -\ \frac{5}{6} \\ \hline \end{array}$ h. $\begin{array}{r} 15 \\ -\ \frac{5}{6} \\ \hline \end{array}$

3. a. $\begin{array}{r} 14\frac{1}{2} \\ -\ 6\frac{2}{3} \\ \hline \end{array}$ b. $\begin{array}{r} 15\frac{5}{6} \\ -10\frac{1}{3} \\ \hline \end{array}$ c. $\begin{array}{r} 11\frac{2}{3} \\ -\ 8\frac{3}{4} \\ \hline \end{array}$ d. $\begin{array}{r} 11\frac{1}{5} \\ -\ 3\frac{1}{4} \\ \hline \end{array}$

e. $\begin{array}{r} 7\frac{1}{5} \\ -2\frac{1}{4} \\ \hline \end{array}$ f. $\begin{array}{r} 15\frac{2}{3} \\ -\ 3\frac{1}{2} \\ \hline \end{array}$ g. $\begin{array}{r} 8\frac{1}{3} \\ -4\frac{1}{2} \\ \hline \end{array}$ h. $\begin{array}{r} 9\frac{1}{4} \\ -6\frac{1}{3} \\ \hline \end{array}$

SUBTRACTION OF FRACTIONS
UNIT III

ANSWERS TO TEST

1. a. 2/3 b. 5/12 c. 7/40 d. 3/8

2. a. 4 1/3 b. 97 5/12 c. 100 1/4

d. 15 11/12 e. 6 1/12 f. 127 5/12

g. 25 1/6 h. 14 1/6

3. a. 7 5/6 b. 5 1/2 c. 2 11/12 d. 7 19/20

e. 4 19/20 f. 12 1/6 g. 3 5/6 h. 2 11/12

MULTIPLICATION OF FRACTIONS
UNIT IV

UNIT OBJECTIVE

After completion of this unit, the student should be able to multiply fractions. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Multiply fractions by fractions.
2. Multiply fractions by whole numbers.
3. Multiply mixed numbers.
4. Multiply fractions using cancellation.

MULTIPLICATION OF FRACTIONS
UNIT IV

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective Sheet

  B. Information Sheet

  C. Assignment Sheets

    1. Assignment Sheet #1--Multiply fraction by fraction.

    2. Assignment Sheet #2--Multiply whole numbers by fractions and fractions by whole numbers.

    3. Assignment Sheet #3--Multiply mixed numbers by whole numbers and whole numbers by mixed numbers.

    4. Assignment Sheet #4--Multiply fractions using cancellation.

    5. Assignment Sheet #5--Multiply a mixed number by a fraction and a fraction by a mixed number.

    6. Assignment Sheet #6--Multiply mixed numers by mixed numbers.

  D. Answers to Assignment Sheets

E. Test

F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Sucess in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ____________. Mathematics Skill Book 6600. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Company, 1983.

MULTIPLICATION OF FRACTIONS
UNIT IV

INFORMATION SHEET

I. Multiply fractions by fractions

   A. Multiply the numerators

   B. Multiply the denominators

   Example: $\frac{2}{3} \times \frac{3}{4} = \frac{2 \times 3}{3 \times 4} = \frac{6}{12}$

   C. Reduce to lowest terms when necessary.

II. Multiply a fraction by whole numbers or a whole number by a fraction.

   A. Write the whole number as a fraction

   Example: $3 \times \frac{2}{3} = \frac{3}{1} \times \frac{2}{3}$

   B. Multiply the numerators.

   C. Multiply the denominators.

   Example: $\frac{3 \times 2}{1 \times 3} = \frac{6}{3}$

   D. Reduce to lowest terms

   Example: $\frac{6}{3} = 6 \div 3 = 2$

III. Multiply a mixed number by a whole number or a whole number by a mixed number.

   A. Write the mixed number as an improper fraction.

   B. Write the whole number as a fraction.

   C. Multiply the fractions.

   D. Reduce to lowest terms.

IV. Multiply a mixed number by a fraction or a fraction by a mixed number.

A. Write the mixed number as an improper fraction.

B. Multiply the fractions.

C. Reduce to lowest terms.

VI. Cancellation--A reducing procedure used before multiplying fractions where one numerator and one denominator have a common factor.

Example: $\frac{1}{2} \times \frac{\cancel{4}^{2}}{5} = \frac{1 \times 2}{1 \times 5} = \frac{2}{5}$

(NOTE: A multiplication number sentence may have one or more cancellation possibilities. The reduceable numerator and denominator may be in position diagonally from each other; the numerator may be directly above the denominator; or they may be separated by another number in the number sentence.)

Example:	$\frac{1}{\cancel{2}} \times \frac{\cancel{4}}{5}$	2 and 4	diagonal
	$\frac{\cancel{3}}{\cancel{6}} \times \frac{4}{5}$	3 and 6	directly above
	$\frac{3}{\cancel{4}} \times \frac{1}{5} \times \frac{\cancel{16}}{17}$	4 and 16	separated by another fraction
	$\frac{\cancel{3}}{\cancel{4}} \times \frac{5}{\cancel{6}} \times \frac{\cancel{16}}{17}$	4 and 16 3 and 6	more than one cancellation

VII. Multiply fractions using cancellation.

Example:

$$\frac{3}{4} \times \frac{5}{12}$$

3 is a common factor of the numerator 3 and of the denominator 12. Divide each by 3 (common factor)

$$\frac{\cancel{3}^{1}}{4} \times \frac{5}{12} = \frac{1 \times 5}{4 \times 4} = \frac{5}{16}$$

Reduce to lowest terms if necessary.

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #1--MULTIPLY FRACTIONS BY FRACTIONS

Directions: Multiply and reduce to the lowest terms.

1. a. $\frac{2}{3} \times \frac{2}{3}$ b. $\frac{4}{5} \times \frac{5}{32}$ c. $\frac{5}{8} \times \frac{7}{16}$

d. $\frac{1}{3} \times \frac{1}{3}$ e. $\frac{1}{4} \times \frac{1}{3}$ f. $\frac{1}{2} \times \frac{1}{3}$

g. $\frac{3}{4} \times \frac{2}{5}$ h. $\frac{2}{3} \times \frac{1}{4}$ i. $\frac{1}{5} \times \frac{2}{10}$

j. $\frac{3}{5} \times \frac{2}{3}$ k. $\frac{2}{3} \times \frac{3}{4}$ l. $\frac{5}{8} \times \frac{2}{5}$

m. $\frac{2}{5} \times \frac{3}{10}$ n. $\frac{3}{8} \times \frac{2}{5}$ o. $\frac{2}{9} \times \frac{2}{3}$

p. $\frac{3}{8} \times \frac{3}{10}$ q. $\frac{3}{4} \times \frac{1}{5}$ r. $\frac{3}{5} \times \frac{6}{8}$

s. $\frac{1}{2} \times \frac{1}{2}$ t. $\frac{8}{9} \times \frac{3}{4}$ u. $\frac{2}{12} \times \frac{6}{8}$

v. $\frac{3}{10} \times \frac{2}{5}$ w. $\frac{1}{5} \times \frac{2}{5}$ x. $\frac{1}{3} \times \frac{2}{3}$

y. $\frac{2}{5} \times \frac{5}{6}$ z. $\frac{1}{3} \times \frac{4}{7}$ aa. $\frac{7}{8} \times \frac{5}{9}$

bb. $\frac{2}{9} \times \frac{4}{9}$ cc. $\frac{3}{4} \times \frac{3}{8}$ dd. $\frac{8}{17} \times \frac{2}{5}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #2--MULTIPLY FRACTIONS BY WHOLE NUMBERS AND WHOLE NUMBERS BY FRACTIONS

Directions: Multiply. Reduce to the lowest term.

1. a. $\frac{2}{3} \times 2$ b. $\frac{5}{12} \times 4$ c. $\frac{4}{9} \times 27$ d. $\frac{5}{8} \times 32$

e. $\frac{13}{24} \times 6$ f. $\frac{1}{3} \times 12$ g. $\frac{5}{9} \times 9$ h. $\frac{7}{8} \times 48$

i. $\frac{12}{23} \times 11$ j. $\frac{9}{10} \times 5$ k. $\frac{6}{7} \times 49$ l. $\frac{5}{8} \times 9$

m. $\frac{7}{8} \times 40$ n. $\frac{2}{5} \times 30$ o. $\frac{24}{25} \times 5$ p. $\frac{11}{30} \times 9$

q. $\frac{5}{11} \times 4$ r. $\frac{4}{13} \times 5$ s. $\frac{1}{2} \times 10$ t. $\frac{2}{9} \times 7$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #3--MULTIPLY MIXED NUMBERS BY WHOLE NUMBERS AND WHOLE NUMBERS BY MIXED NUMBERS

Directions: Multiply.

a. $3\frac{1}{2} \times 3$

b. $5\frac{1}{4} \times 6$

c. $7\frac{1}{2} \times 4$

d. $5\frac{1}{4} \times 2$

e. $8\frac{3}{4} \times 2$

f. $3\frac{2}{7} \times 7$

g. $6\frac{1}{3} \times 3$

h. $9\frac{5}{6} \times 8$

i. $8\frac{7}{8} \times 6$

j. $5 \times 6\frac{2}{3}$

k. $7 \times 8\frac{9}{10}$

l. $3 \times 1\frac{2}{3}$

m. $10 \times 7\frac{1}{2}$

n. $11 \times 6\frac{3}{4}$

o. $12 \times 9\frac{1}{2}$

p. $8 \times 1\frac{3}{4}$

q. $4 \times 8\frac{1}{9}$

r. $6 \times 9\frac{5}{6}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #4--MULTIPLY FRACTIONS USING CANCELLATION

Directions: Multiply and cancel whenever possible.

a. $\frac{2}{3} \times \frac{9}{12}$ b. $\frac{27}{32} \times \frac{4}{9}$ c. $\frac{7}{9} \times \frac{81}{100}$

d. $\frac{7}{11} \times \frac{22}{25}$ e. $\frac{8}{9} \times \frac{11}{56}$ f. $\frac{25}{100} \times \frac{5}{20}$

g. $\frac{6}{8} \times \frac{64}{66}$ h. $\frac{7}{9} \times \frac{9}{77}$ i. $\frac{2}{8} \times \frac{7}{12}$

j. $\frac{4}{5} \times \frac{5}{12}$ k. $\frac{36}{44} \times \frac{22}{108}$ l. $\frac{7}{12} \times \frac{60}{77}$

m. $\frac{5}{8} \times \frac{8}{20}$ n. $\frac{11}{24} \times \frac{48}{42}$ o. $\frac{6}{8} \times \frac{64}{132}$

p. $\frac{2}{3} \times \frac{9}{18}$ q. $\frac{9}{10} \times \frac{7}{81}$ r. $\frac{5}{6} \times \frac{36}{38}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #5--MULTIPLY A MIXED NUMBER BY A FRACTION AND A FRACTION BY A MIXED NUMBER

Directions: Multiply and reduce to lowest terms.

a. $3\frac{3}{4} \times \frac{2}{3}$

b. $5\frac{3}{4} \times \frac{6}{7}$

c. $6\frac{5}{7} \times \frac{3}{5}$

d. $8\frac{1}{2} \times \frac{5}{6}$

e. $9\frac{7}{8} \times \frac{1}{6}$

f. $12\frac{3}{4} \times \frac{1}{2}$

g. $7\frac{8}{9} \times \frac{1}{9}$

h. $6\frac{3}{4} \times \frac{1}{3}$

i. $5\frac{2}{3} \times \frac{1}{4}$

j. $\frac{1}{4} \times 1\frac{1}{2}$

k. $\frac{3}{5} \times 1\frac{2}{3}$

l. $\frac{5}{6} \times 5\frac{2}{3}$

m. $\frac{2}{9} \times 3\frac{1}{4}$

n. $\frac{5}{7} \times 8\frac{1}{10}$

o. $\frac{8}{15} \times 2\frac{5}{6}$

p. $\frac{3}{4} \times 12\frac{1}{2}$

q. $\frac{5}{8} \times 13\frac{1}{2}$

r. $\frac{6}{7} \times 6\frac{1}{3}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #6--MULTIPLY MIXED NUMBERS BY MIXED NUMBERS

Directions: Multiply and reduce to the lowest terms.

a. $5\frac{2}{3} \times 1\frac{6}{7}$

b. $6\frac{2}{3} \times 5\frac{2}{5}$

c. $1\frac{4}{8} \times 6\frac{2}{7}$

d. $3\frac{1}{2} \times 3\frac{1}{2}$

e. $5\frac{4}{5} \times 3\frac{7}{8}$

f. $9\frac{6}{7} \times 10\frac{2}{6}$

g. $7\frac{3}{4} \times 6\frac{2}{5}$

h. $9\frac{1}{2} \times 2\frac{7}{8}$

i. $7\frac{2}{3} \times 1\frac{2}{5}$

j. $7\frac{8}{9} \times 1\frac{2}{7}$

k. $2\frac{1}{3} \times 3\frac{4}{7}$

l. $9\frac{5}{11} \times 2\frac{1}{3}$

m. $12\frac{1}{4} \times 3\frac{2}{5}$

n. $13\frac{1}{3} \times 2\frac{7}{8}$

o. $3\frac{2}{7} \times 1\frac{8}{9}$

p. $22\frac{1}{3} \times 7\frac{4}{9}$

q. $5\frac{4}{9} \times 8\frac{7}{7}$

r. $5\frac{3}{4} \times 2\frac{1}{2}$

s. $7\frac{3}{5} \times 10\frac{4}{7}$

t. $8\frac{11}{12} \times 3\frac{7}{12}$

u. $3\frac{2}{3} \times 9\frac{5}{8}$

v. $7\frac{1}{3} \times 6\frac{2}{3}$

w. $9\frac{5}{8} \times 11\frac{3}{8}$

x. $2\frac{1}{2} \times 3\frac{1}{2}$

y. $22\frac{1}{3} \times 33\frac{2}{3}$

z. $13\frac{1}{2} \times 11\frac{1}{4}$

aa. $2\frac{1}{4} \times 1\frac{3}{4}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1.
a. $\frac{4}{9}$
b. $\frac{1}{8}$
c. $\frac{35}{128}$
d. $\frac{1}{9}$
e. $\frac{1}{12}$
f. $\frac{1}{6}$
g. $\frac{3}{10}$
h. $\frac{1}{6}$
i. $\frac{1}{25}$
j. $\frac{2}{5}$
k. $\frac{1}{2}$
l. $\frac{1}{4}$
m. $\frac{3}{25}$
n. $\frac{3}{20}$
o. $\frac{4}{27}$
p. $\frac{9}{80}$
q. $\frac{3}{20}$
r. $\frac{9}{20}$
s. $\frac{1}{4}$
t. $\frac{2}{3}$
u. $\frac{1}{8}$
v. $\frac{3}{25}$
w. $\frac{2}{25}$
x. $\frac{2}{9}$
y. $\frac{1}{3}$
z. $\frac{4}{21}$
aa. $\frac{35}{72}$
bb. $\frac{8}{81}$
cc. $\frac{9}{32}$
dd. $\frac{16}{85}$

ASSIGNMENT SHEET #2

1.
a. $1\frac{1}{3}$
b. $1\frac{2}{3}$
c. 12
d. 20
e. $3\frac{1}{4}$
f. 4
g. 5
h. 42
i. $5\frac{17}{23}$
j. $4\frac{1}{2}$
k. 42
l. $5\frac{5}{8}$
m. 35
n. 12
o. $4\frac{4}{5}$
p. $3\frac{3}{10}$
q. $1\frac{9}{11}$
r. $1\frac{7}{13}$
s. 5
t. $1\frac{5}{9}$

MULTIPLICATION OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #3

a. $10\frac{1}{2}$
b. $31\frac{1}{2}$
c. 30
d. $10\frac{1}{2}$
e. $17\frac{1}{2}$
f. 23
g. 19
h. $78\frac{2}{3}$
i. $53\frac{1}{4}$
j. $33\frac{1}{3}$
k. $62\frac{3}{10}$
l. 5
m. 75
n. $74\frac{1}{4}$
o. 114
p. 14
q. $32\frac{4}{9}$
r. 59

ASSIGNMENT SHEET #4

a. $\frac{1}{2}$
b. $\frac{3}{8}$
c. $\frac{63}{100}$
d. $\frac{14}{25}$
e. $\frac{11}{63}$
f. $\frac{1}{16}$
g. $\frac{8}{11}$
h. $\frac{1}{11}$
i. $\frac{7}{48}$
j. $\frac{1}{3}$
k. $\frac{1}{6}$
l. $\frac{5}{11}$
m. $\frac{1}{4}$
n. $\frac{11}{21}$
o. $\frac{4}{11}$
p. $\frac{1}{3}$
q. $\frac{7}{90}$
r. $\frac{15}{19}$

MULTIPLICATIONS OF FRACTIONS
UNIT IV

ASSIGNMENT SHEET #5

a. $2\frac{1}{2}$
b. $4\frac{13}{14}$
c. $4\frac{1}{35}$
d. $7\frac{1}{12}$
e. $1\frac{31}{48}$
f. $6\frac{3}{8}$
g. $\frac{71}{81}$
h. $2\frac{1}{4}$
i. $1\frac{5}{12}$
j. $\frac{3}{8}$
k. 1
l. $4\frac{13}{18}$
m. $\frac{13}{18}$
n. $5\frac{11}{14}$
o. $1\frac{23}{45}$
p. $9\frac{3}{8}$
q. $8\frac{7}{16}$
r. $5\frac{3}{7}$

ASSIGNMENT SHEET #6

a. $10\frac{11}{21}$
b. 36
c. $9\frac{3}{7}$
d. $12\frac{1}{4}$
e. $22\frac{19}{40}$
f. $101\frac{6}{7}$
g. $49\frac{3}{5}$
h. $27\frac{5}{16}$
i. $10\frac{11}{15}$
j. $10\frac{1}{7}$
k. $8\frac{1}{3}$
l. $22\frac{2}{33}$
m. $41\frac{13}{20}$
n. $38\frac{1}{3}$
o. $6\frac{13}{63}$

p. $166\frac{7}{27}$

q. 49

r. $14\frac{3}{8}$

s. $80\frac{12}{35}$

t. $31\frac{137}{144}$

u. $35\frac{7}{24}$

v. $48\frac{8}{9}$

w. $109\frac{31}{64}$

x. $8\frac{3}{4}$

y. $751\frac{8}{9}$

z. $151\frac{7}{8}$

aa. $3\frac{15}{16}$

MULTIPLICATION OF FRACTIONS
UNIT IV
TEST

Multiply and simplify where possible.

1. a. $\frac{5}{8} \times \frac{3}{4} =$
   b. $\frac{2}{3} \times \frac{1}{4} =$
   c. $\frac{1}{5} \times \frac{5}{16} =$
   d. $\frac{2}{3} \times \frac{3}{4} =$
   e. $\frac{5}{6} \times \frac{36}{38} =$

2. a. $\frac{2}{3} \times 2 =$
   b. $5 \times \frac{9}{10} =$
   c. $\frac{7}{8} \times 40 =$
   d. $10 \times \frac{1}{2} =$
   e. $1\frac{3}{4} \times 2 =$
   f. $3 \times \frac{4}{9} =$

3. a. $3\frac{1}{4} \times 5\frac{1}{2} =$
   b. $5\frac{4}{5} \times 3\frac{6}{8} =$
   c. $1\frac{4}{8} \times 6\frac{2}{7} =$
   d. $5\frac{2}{3} \times 1\frac{6}{7} =$
   e. $3\frac{1}{2} \times 4\frac{3}{8} =$

4. a. $\frac{9}{10} \times \frac{7}{81} =$
   b. $\frac{6}{8} \times \frac{64}{132} =$
   c. $\frac{5}{8} \times \frac{8}{20} =$
   d. $8\frac{1}{3} \times \frac{4}{5} =$

MULTIPLICATION OF FRACTIONS
UNIT IV

ANSWERS TO TEST

1. a. $\frac{15}{32}$
   b. $\frac{1}{6}$
   c. $\frac{1}{16}$
   d. $\frac{1}{2}$
   e. $\frac{15}{19}$

2. a. $1\frac{1}{3}$
   b. $4\frac{1}{2}$
   c. 35
   d. 5
   e. $3\frac{1}{2}$
   f. $1\frac{1}{3}$

3. a. $17\frac{7}{8}$
   b. $21\frac{3}{4}$
   c. $9\frac{3}{7}$
   d. $10\frac{11}{21}$
   e. $15\frac{5}{16}$

4. a. $\frac{7}{90}$
   b. $\frac{4}{11}$
   c. $\frac{1}{4}$
   d. $6\frac{2}{3}$

DIVISION OF FRACTIONS
UNIT V

UNIT OBJECTIVE

After completion of this unit, the student should be able to divide fractions. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Identify common divisor.
2. Divide any whole number by a fraction.
3. Divide any fraction by a whole number.
4. Divide any fraction by a fraction.
5. Divide any whole number by a mixed number.
6. Divide any mixed fraction by a whole number.
7. Divide any fraction by a mixed number.
8. Divide any mixed number by a fraction.
9. Divide any mixed number by a mixed number.

DIVISION OF FRACTIONS
UNIT V

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information Sheet

  C. Assignment sheets.

    1. Assignment Sheet #1--Identify common divisors.

    2. Assignment Sheet #2--Divide any whole number by a fraction.

    3. Assignment Sheet #3--Divide any fraction by a whole number.

    4. Assignment Sheet #4--Divide any fraction by a fraction.

    5. Assignment Sheet #5--Divide any whole number by a mixed number.

    6. Assignment Sheet #6--Divide any mixed number by a whole number.

    7. Assignment Sheet #7--Divide any fraction by a mixed number.

8. Assignment Sheet #8--Divide any mixed number by a fraction.

9. Assignment Sheet #9--Divide any mixed number by a mixed number.

D. Answers to assignment sheets

E. Test

F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Baughn Co., 1980.

C. ______________. Mathematics Skill Book 6600. Austin, TX 78768: Stck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Company, 1983.

DIVISION OF FRACTIONS
UNIT V

INFORMATION SHEET

I. Terms and definitions

A. Reciprocal--The reciprocal of a fraction is the fraction with the numerator and the denominator interchanged.

B. Inversion--The interchanging of the numerator and the denominator of a fraction.

II. Procedures

A. Divide a fraction by a fraction

1. Write the division problem as a multiplication equation by replacing the divisor with its reciprocal and by replacing the division sign (÷) with the multiplication sign (x).

Example:

$$\frac{4}{5} \div \frac{3}{4} = \frac{4}{5} \times \frac{4}{3}$$

2. Multiply the fractions.

3. Reduce to lowest terms.

B. Divide any whole number by a fraction.

1. Write tht whole number as a fraction.

2. Rewrite the division problem as a multiplication equation by replacing the divisor with its reciprocal and by replacing the division sign (÷) with a multiplication sign (x).

3. Multiply the fractions.

4. Reduce to lowest terms.

C. Divide any fraction by a whole number.

1. Write the whole number as a fraction.

2. Rewrite the division equation as a multiplication equation by replacing the divisor with its reciprocal and by replacing the division sign (÷) with a multiplication sign (x).

3. Multiply the fractions.

4. Reduce to lowest terms.

D. Divide mixed numbers.

1. Write any mixed number as an improper fraction.

2. Rewrite the division equation as a multiplication equation by replacing the divisor with its reciprocal and by replacing the division sign (÷) with the multiplication sign (x).

3. Multiply the fractions.

4. Reduce to lowest terms.

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #1--IDENTIFY COMMON DIVISOR

Directions: List the common divisors for the following numbers.

a. 136, 68
b. 10, 25
c. 33, 3
d. 72, 81
e. 28, 49
f. 56, 80
g. 327, 33
h. 36, 12
i. 36, 18
j. 8, 72
k. 70, 100
l. 24, 8
m. 16, 24
n. 20, 35
o. 25, 100
p. 99, 33
q. 27, 81
r. 15, 40
s. 4, 24
t. 32, 96

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #2--DIVIDE ANY WHOLE NUMBER BY A FRACTION.

Directions: Divide and simplify if possible.

a. $5 \div \frac{2}{3}$

b. $7 \div \frac{3}{28}$

c. $24 \div \frac{7}{8}$

d. $9 \div \frac{2}{3}$

e. $12 \div \frac{7}{9}$

f. $39 \div \frac{2}{5}$

g. $70 \div \frac{5}{9}$

h. $26 \div \frac{2}{3}$

i. $35 \div \frac{5}{8}$

j. $15 \div \frac{3}{5}$

k. $21 \div \frac{4}{8}$

l. $16 \div \frac{3}{4}$

m. $16 \div \frac{2}{3}$

n. $5 \div \frac{6}{7}$

o. $32 \div \frac{4}{9}$

p. $18 \div \frac{3}{4}$

q. $125 \div \frac{5}{8}$

r. $80 \div \frac{4}{7}$

s. $72 \div \frac{8}{9}$

t. $106 \div \frac{2}{3}$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #3--DIVIDE ANY FRACTION BY A WHOLE NUMBER

Directions: Divide. Cancel and reduce if possible.

a. $\frac{1}{2} \div 6$

b. $\frac{3}{8} \div 6$

c. $\frac{2}{3} \div 14$

d. $\frac{7}{8} \div 42$

e. $\frac{5}{9} \div 25$

f. $\frac{2}{3} \div 10$

g. $\frac{25}{72} \div 5$

h. $\frac{3}{8} \div 27$

i. $\frac{2}{3} \div 15$

j. $\frac{5}{9} \div 20$

k. $\frac{3}{8} \div 5$

l. $\frac{5}{16} \div 5$

m. $\frac{4}{9} \div 96$

n. $\frac{2}{3} \div 23$

o. $\frac{3}{4} \div 24$

p. $\frac{8}{17} \div 34$

q. $\frac{2}{3} \div 18$

r. $\frac{3}{4} \div 9$

s. $\frac{2}{16} \div 8$

t. $\frac{3}{8} \div 22$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #4--DIVIDE ANY FRACTION BY A FRACTION

Directions: Divide. Cancel, simplify, and reduce if possible.

a. $\frac{2}{3} \div \frac{3}{8}$

b. $\frac{3}{4} \div \frac{5}{8}$

c. $\frac{5}{8} \div \frac{3}{4}$

d. $\frac{5}{16} \div \frac{2}{3}$

e. $\frac{8}{32} \div \frac{16}{24}$

f. $\frac{9}{18} \div \frac{3}{6}$

g. $\frac{7}{56} \div \frac{3}{8}$

h. $\frac{9}{20} \div \frac{3}{5}$

i. $\frac{5}{30} \div \frac{1}{5}$

j. $\frac{7}{17} \div \frac{5}{34}$

k. $\frac{4}{5} \div \frac{1}{10}$

l. $\frac{3}{8} \div \frac{3}{4}$

m. $\frac{5}{16} \div \frac{3}{8}$

n. $\frac{7}{12} \div \frac{3}{4}$

o. $\frac{3}{4} \div \frac{7}{12}$

p. $\frac{5}{8} \div \frac{5}{6}$

q. $\frac{5}{12} \div \frac{7}{8}$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #5--DIVIDE ANY WHOLE NUMBER BY A FRACTION

Directions: Divide. Cancel, simplify, and reduce if possible.

a. $5 \div \frac{2}{3}$

b. $25 \div \frac{5}{8}$

c. $16 \div \frac{8}{9}$

d. $25 \div \frac{2}{5}$

e. $9 \div \frac{2}{3}$

f. $10 \div \frac{2}{3}$

g. $15 \div \frac{5}{7}$

h. $12 \div \frac{3}{4}$

i. $8 \div \frac{4}{8}$

j. $23 \div \frac{2}{\text{[illegible]}}$

k. $5 \div \frac{5}{8}$

l. $6 \div \frac{12}{23}$

m. $9 \div \frac{5}{7}$

n. $11 \div \frac{1}{33}$

o. $81 \div \frac{9}{10}$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #6--DIVIDE ANY MIXED NUMBER BY A WHOLE NUMBER

Directions: Divide. Cancel, simplify, and reduce if possible

a. $2\frac{2}{3} \div 2$

b. $4\frac{2}{3} \div 2$

c. $6\frac{2}{3} \div 10$

d. $3\frac{1}{3} \div 3$

e. $3\frac{1}{3} \div 15$

f. $4\frac{1}{4} \div 8$

g. $6\frac{3}{4} \div 4$

h. $3\frac{2}{3} \div 9$

i. $5\frac{2}{5} \div 6$

j. $7\frac{2}{3} \div 3$

k. $5\frac{4}{9} \div 7$

l. $3\frac{5}{7} \div 2$

m. $2\frac{3}{4} \div 12$

n. $1\frac{2}{6} \div 3$

o. $1\frac{4}{9} \div 9$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #7--DIVIDE ANY FRACTION BY A MIXED NUMBER

Directions: Divide. Cancel, simplify, and reduce if possible.

a. $\frac{2}{3} \div 2\,\frac{2}{3}$

b. $\frac{4}{5} \div 3\,\frac{7}{9}$

c. $\frac{5}{9} \div 1\,\frac{7}{8}$

d. $\frac{9}{12} \div 2\,\frac{3}{8}$

e. $\frac{2}{3} \div 1\,\frac{5}{6}$

f. $\frac{2}{7} \div 3\,\frac{4}{5}$

g. $\frac{7}{9} \div 3\,\frac{2}{7}$

h. $\frac{2}{3} \div 5\,\frac{1}{5}$

i. $\frac{1}{6} \div 2\frac{1}{6}$

j. $\frac{2}{7} \div 9\,\frac{3}{4}$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #8--DIVIDE ANY MIXED NUMBER BY A FRACTION

Directions: Divide. Cancel, simplify, and reduce if possible.

a. $2\frac{2}{3} \div \frac{2}{3}$

b. $3\frac{7}{9} \div \frac{4}{5}$

c. $1\frac{7}{8} \div \frac{5}{9}$

d. $2\frac{3}{8} \div \frac{9}{12}$

e. $1\frac{5}{6} \div \frac{2}{3}$

f. $3\frac{4}{5} \div \frac{2}{7}$

g. $3\frac{2}{7} \div \frac{7}{9}$

h. $5\frac{1}{5} \div \frac{2}{3}$

i. $2\frac{1}{6} \div \frac{1}{6}$

j. $9\frac{2}{4} \div \frac{2}{7}$

DIVISION OF FRACTIONS
UNIT V

ASSIGNMENT SHEET #9--DIVIDE ANY MIXED NUMBER BY A MIXED NUMBER

Directions: Divide. Cancel, simplify, and reduce if possible.

a. $5\frac{2}{8} \div 3\frac{3}{8}$

b. $10\frac{1}{2} \div 5\frac{1}{2}$

c. $7\frac{2}{8} \div 1\frac{7}{9}$

d. $5\frac{6}{8} \div 1\frac{1}{2}$

e. $7\frac{6}{7} \div 3\frac{1}{8}$

f. $7\frac{1}{3} \div 2\frac{3}{4}$

g. $2\frac{1}{2} \div 1\frac{1}{2}$

h. $2\frac{2}{3} \div 1\frac{2}{3}$

i. $5\frac{1}{5} \div 3\frac{1}{4}$

j. $7\frac{2}{3} \div 1\frac{1}{2}$

DIVISION OF FRACTIONS
UNIT V

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

a. 2, 17, 4, 68, 34
b. 5
c. 3
d. 9, 3
e. 7
f. 8, 2
g. 3
h. 2, 6, 3, 4, 12
i. 2, 6, 9, 18
j. 8, 24
k. 10, 2, 5
l. 2, 4, 8
m. 2, 4, 8
n. 5
o. 5, 25
p. 3, 11, 33
q. 9, 3, 27
r. 5
s. 4, 2
t. 2, 4, 8, 16, 32

ASSIGNMENT SHEET #2

a. $7\frac{1}{2}$
b. $65\frac{1}{3}$
c. $27\frac{3}{7}$
d. $13\frac{1}{2}$
e. $15\frac{3}{7}$
f. $97\frac{1}{2}$
g. 126
h. 39
i. 56
j. 25
k. 42
l. $21\frac{1}{3}$
m. 24
n. $5\frac{5}{6}$

o. 72

p. 24

q. 200

r. 140

s. 81

t. 159

ASSIGNMENT SHEET #3

a. $\frac{1}{12}$

b. $\frac{1}{16}$

c. $\frac{1}{21}$

d. $\frac{1}{48}$

e. $\frac{1}{45}$

f. $\frac{1}{15}$

g. $\frac{5}{72}$

h. $\frac{1}{72}$

i. $\frac{2}{45}$

j. $\frac{1}{36}$

k. $\frac{3}{40}$

l. $\frac{1}{16}$

m. $\frac{1}{216}$

n. $\frac{2}{69}$

o. $\frac{1}{32}$

p. $\frac{4}{289}$

q. $\frac{1}{27}$

r. $\frac{1}{12}$

s. $\frac{1}{64}$

t. $\frac{3}{176}$

ASSIGNMENT SHEET #4

a. $1\frac{7}{9}$

b. $1\frac{1}{5}$

c. $\frac{5}{6}$

d. $\frac{15}{32}$

e. $\frac{3}{8}$

f. 1

g. $\frac{1}{3}$
h. $\frac{3}{4}$
i. $\frac{5}{6}$
j. $2\frac{4}{5}$
k. 8
l. $\frac{1}{2}$
m. $1\frac{1}{2}$
n. $\frac{7}{9}$
o. $1\frac{2}{7}$
p. $\frac{3}{4}$
q. $\frac{10}{21}$

ASSIGNMENT SHEET #5

a. $7\frac{1}{2}$
b. 40
c. 18
d. $62\frac{1}{2}$
e. $13\frac{1}{2}$
f. 15
g. 21
h. 16
i. 16
j. $34\frac{1}{2}$
k. 8
l. $11\frac{1}{2}$
m. $12\frac{3}{5}$
n. 363
o. 90

ASSIGNMENT SHEET #6

a. $1\frac{1}{3}$
b. $2\frac{1}{3}$
c. $\frac{2}{3}$
d. $1\frac{1}{9}$

e. $\frac{2}{9}$

f. $\frac{17}{32}$

g. $1\frac{11}{16}$

h. $\frac{11}{27}$

i. $\frac{9}{10}$

j. $2\frac{5}{9}$

k. $\frac{7}{9}$

l. $1\frac{6}{7}$

m. $\frac{11}{48}$

n. $\frac{4}{9}$

o. $\frac{13}{81}$

ASSIGNMENT SHEET #7

a. $\frac{1}{4}$

b. $\frac{18}{85}$

c. $\frac{8}{27}$

d. $\frac{6}{19}$

e. $\frac{4}{11}$

f. $\frac{10}{133}$

g. $\frac{49}{207}$

h. $\frac{5}{39}$

i. $\frac{1}{13}$

j. $\frac{8}{273}$

ASSIGNMENT SHEET #8

a. 4

b. $4\frac{13}{18}$

c. $3\frac{3}{8}$

d. $3\frac{1}{6}$

e. $2\frac{3}{4}$

f. $13\frac{3}{10}$

g. $4\frac{11}{49}$

h. $7\frac{4}{5}$

i. 13

j. $34\frac{1}{4}$

ASSIGNMENT SHEET #9

a. $1\frac{5}{9}$

b. $1\frac{10}{11}$

c. $4\frac{5}{64}$

d. $3\frac{5}{6}$

e. $2\frac{18}{35}$

f. $2\frac{2}{3}$

g. $1\frac{2}{3}$

h. $1\frac{3}{5}$

i. $1\frac{3}{5}$

j. $5\frac{1}{9}$

DIVISION OF FRACTIONS
UNIT V

TEST

Directions: List the common divisors for each pair of numbers.

1. a. 136, 68 b. 20, 35

c. 70, 100 d. 33, 3

e. 4, 24 f. 27, 81

Directions: Cancel, simplify, and reduce if possible.

2. a. $5 \div \frac{2}{3} =$ b. $70 \div \frac{5}{9} =$

3. a. $\frac{1}{2} \div 6 =$ b. $\frac{3}{8} \div 5 =$

4. a. $\frac{2}{3} \div \frac{3}{8} =$ b. $\frac{5}{8} \div \frac{5}{6} =$

5. a. $8 \div 1\frac{1}{2} =$ b. $12 \div 2\frac{1}{4} =$

6. a. $3\frac{5}{7} \div 2 =$ b. $15\frac{1}{3} \div 3 =$

7. a. $\frac{2}{3} \div 1\frac{5}{6} =$ b. $\frac{4}{5} \div 3\frac{7}{9} =$

8. a. $2\frac{2}{3} \div \frac{2}{3} =$ b. $3\frac{4}{5} \div \frac{2}{7} =$

9. a. $5\frac{2}{8} \div 3\frac{3}{8} =$ b. $7\frac{2}{3} \div 1\frac{1}{2} =$

DIVISION OF FRACTIONS
UNIT V

ANSWERS TO TEST

1. a. 2, 17, 4, 68, 34 b. 5
   c. 2, 5, 10 d. 3
   e. 2, 4 f. 3, 9, 27

2. a. $7\frac{1}{2}$ b. 126

3. a. $\frac{1}{12}$ b. $\frac{3}{40}$

4. a. $1\frac{7}{9}$ b. $\frac{3}{4}$

5. a. $5\frac{1}{3}$ b. $5\frac{1}{3}$

6. a. $1\frac{6}{7}$ b. $5\frac{1}{9}$

7. a. $\frac{4}{11}$ b. $\frac{18}{85}$

8. a. 4 b. $13\frac{3}{10}$

9. a. $1\frac{5}{9}$ b. $5\frac{1}{9}$

MIXED COMPUTATION OF FRACTIONS
UNIT VI

UNIT OBJECTIVE

After completion of this unit, the student should be able to identify and compute mixed fractions. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Identify the operation indicated by a given symbol or term.
2. Solve a fractions problem by applying the indicated operation.

MIXED COMPUTATION OF FRACTIONS
UNIT VI

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test restults.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment Sheets

    1. Assignment Sheet #1--Match the operation indicated with a given symbol or term.

    2. Assignment Sheet #2--Solve a fraction problem by applying the indicated operation.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

  A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I. 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________. Mathematics Skill Book 6600. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Company, 1983.

MIXED COMPUTATIONS OF FRACTIONS
UNIT VI

INFORMATION SHEET

I. Types of fractions

A. Proper--The numerator is smaller than the denominator.

Example: $\frac{1}{2}, \frac{3}{8}, \frac{4}{5}$

B. Improper--The numerator is equal to or larger than the denominator.

Example: $\frac{5}{4}, \frac{3}{2}, \frac{3}{3}$

C. Mixed numbers--A whole number and a fraction

Examples: $1\frac{1}{2}, 3\frac{2}{3}, 5\frac{5}{6}$

II. Procedures

A. Reduce fractions

1. Divide both numerator and denominator by the same number.

2. Continue dividing until one is the only number left that will divide both the numerator and the denominator.

Example: $\frac{45}{60}; \quad \frac{45 \div 5}{60 \div 5} = \frac{9 \div 3}{12 \div 3} = \frac{3}{4}$

B. Change improper fractions to mixed numbers

1. Divide the denominator into the numerator

Example: $\frac{38}{20}; \quad \begin{array}{r} 1 \\ 20\overline{)38} \\ \underline{20} \\ 18 \end{array} ; \quad 1\frac{18}{20} = 1\frac{9}{10}$

C. Change mixed numbers to improper fractions.

1. Multiply the denominator and the whole number.

2. Add the numerator.

3. Write the result over the denominator

Example: $3\frac{3}{4}$; (3 x 4) + 3 = 15; $3\frac{3}{4} = \frac{15}{4}$

D. Equivalent fractions are different names for the same fractions.

Example: $\frac{3}{4} = \frac{6}{8}$

III. Operations

A. Addition--Indicated by terms such as plus, add, total, sum or the symbol (+).

1. Write the fractions as like fractions

2. Add the numerators

3. Write the common denominator

4. Reduce the answer, if possible

B. Subtraction--Indicated by terms such as minus, less, subtract, find the difference or by the symbol (-).

1. Write the fractions as like fractions

2. Subtract the numerators

3. Write the common denominator

4. Reduce the answer, if possible

C. Multiplication--Indicated by terms such as times, of, product, or by the symbols ( ) ( ) or (x).

1. Multiply the numerators

2. Multiply the denominators

3. Reduce the answer, if possible

D. Division--Indicated by the terms quotient, divide, or by the symbols ($\overline{)\quad}$) or (÷).

1. Invert the divisor

2. Multiply the resulting fractions

3. Reduce the answer, if possible

IV. Ratio and Proportion

A. Ratio--Comparison between two similar quantities, showing how namy times larger or smaller one quantity is than another.

Example: 3 cars compared to 7 trucks;

a 3 to 7 ratio, written as a fraction,

$\frac{3}{7}$ or written as 3:7

B. Proportion--An equal relationship between two or more ratios.

Example: written as $\frac{5}{8} = \frac{15}{24}$ or 5:8 = 15:24

5 is related to 8 in the same way that 15 is related to 24.

(NOTE: Proportion parts are named means or extremes.)

Example: $\frac{5}{8} = \frac{15}{24}$ or 5:8 = 15:24

$\frac{\text{extreme}}{\text{mean}} = \frac{\text{mean}}{\text{extreme}}$ or

extreme:mean = mean:extreme

(NOTE: In a correct proportion, the product of the means equals the product of the extremes.)

Example: $\frac{5}{8} = \frac{15}{24}$

$$\begin{aligned} 5 \times 24 &= 8 \times 15 \\ 120 &= 120 \end{aligned}$$

C. Solving a Proportion

When three parts of a proportion are known and the fourth is unknown:

1. Multiply the two known like means or extremes.

2. Divide the product by the remaining known quantity.

Example: $\frac{3}{10} = \frac{?}{50}$

$$\begin{aligned} 3 \times 50 &= ? \times 10 \\ 150 &= ? \times 10 \\ ? &= 15 \end{aligned}$$

MIXED COMPUTATIONS OF FRACTIONS
UNIT VI

ASSIGNMENT SHEET #1--MATCH THE OPERATION INDICATED WITH A GIVEN SYMBOL OR TERM

Directions: Match the following symbol or term in column one with the operation in column two. Place the letter of your answer in the blank.

1.

_____a. x

_____b. -

_____c. ÷

_____d. +

_____e. difference

_____f. product

_____g. sum

_____h. Invert, reciprocal

_____i. add

_____j. divide

_____k. multiply

_____l. subtract

_____m. minus

_____n. plus

_____o. of

2.

A. addition

B. subtraction

C. multiplication

D. division

MIXED COMPUTATIONS OF FRACTIONS
UNIT VI

ASSIGNMENT SHEET #2--SOLVE A FRACTIONS PROBLEM BY APPLYING THE INDICATED OPERATION

Directions: Solve the following problems as indicated by the sign. Answer should be in the lowest terms.

1. a. $5\frac{3}{4} - 2\frac{1}{2}$ b. $7\frac{2}{3} + 1\frac{1}{2}$

c. $2\frac{2}{3} \times \frac{3}{4}$ d. $2\frac{3}{4} \div \frac{7}{8}$

e. $2 \div 1\frac{3}{4}$ f. $2 \times \frac{1}{3}$

g. $\frac{1}{2} - \frac{1}{4}$ h. $\frac{7}{8} + \frac{2}{3}$

i. $1\frac{3}{4} \times 2\frac{1}{2}$ j. $2\frac{1}{2} \div 1\frac{3}{4}$

k. $2\frac{1}{3} + 1$ l. $4\frac{3}{4} - 3$

m. $3 - \frac{1}{2}$ n. $3 + \frac{26}{45}$

o. $7\frac{2}{3} \div 2$ p. $7\frac{1}{2} \times 5$

q. $\frac{3}{4} \times 1\frac{2}{7}$ r. $\frac{3}{8} \div 1\frac{1}{2}$

s. $2 + \frac{1}{2} + \frac{3}{4}$ t. $3\frac{7}{8} - 1\frac{4}{8}$

u. $5\frac{1}{3} \div \frac{1}{4}$ v. $2\frac{1}{4} \times \frac{1}{4}$

w. $5\frac{1}{2} - \frac{1}{4}$ x. $8\frac{3}{4} + \frac{1}{4}$

y. $7\frac{2}{3} \div \frac{3}{8}$ z. $5\frac{1}{2} - 1\frac{3}{16}$

MIXED COMPUTATIONS OF FRACTIONS
UNIT VI

ASSIGNMENT SHEET #2--SOLVE A FRACTIONS PROBLEM BY APPLYING THE INDICATED OPERATION

Directions: Solve the following problems as indicated by the sign. Answer should be in the lowest terms.

1. a. $5\frac{3}{4} - 2\frac{1}{2}$ b. $7\frac{2}{3} + 1\frac{1}{2}$

c. $2\frac{2}{3} \times \frac{3}{4}$ d. $2\frac{3}{4} \div \frac{7}{8}$

e. $2 \div 1\frac{3}{4}$ f. $2 \times \frac{1}{3}$

g. $\frac{1}{2} - \frac{1}{4}$ h. $\frac{7}{8} + \frac{2}{3}$

i. $1\frac{3}{4} \times 2\frac{1}{2}$ j. $2\frac{1}{2} \div 1\frac{3}{4}$

k. $2\frac{1}{3} + 1$ l. $4\frac{3}{4} - 3$

m. $3 - \frac{1}{2}$ n. $3 + \frac{26}{45}$

o. $7\frac{2}{3} \div 2$ p. $7\frac{1}{2} \times 5$

q. $\frac{3}{4} \times 1\frac{2}{7}$ r. $\frac{3}{8} \div 1\frac{1}{2}$

s. $2 + \frac{1}{2} + \frac{3}{4}$ t. $3\frac{7}{8} - 1\frac{4}{8}$

u. $5\frac{1}{3} \div \frac{1}{4}$ v. $2\frac{1}{4} \times \frac{1}{4}$

w. $5\frac{1}{2} - \frac{1}{4}$ x. $8\frac{3}{4} + \frac{1}{4}$

y. $7\frac{2}{3} \div \frac{3}{8}$ z. $5\frac{1}{2} - 1\frac{3}{16}$

MIXED COMPUTATION OF FRACTIONS
UNIT VI

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. C
   b. B
   c. D
   d. A
   e. B
   f. C
   g. A
   h. D
   i. A
   j. D
   k. C
   l. B
   m. B
   n. A
   o. C

ASSIGNMENT SHEET #2

1. a. $3\frac{1}{4}$
   b. $9\frac{1}{6}$
   c. 2
   d. $3\frac{1}{7}$
   e. $1\frac{1}{7}$
   f. $\frac{2}{3}$
   g. $\frac{1}{4}$
   h. $1\frac{13}{24}$
   i. $4\frac{3}{8}$
   j. $1\frac{3}{7}$
   k. $3\frac{1}{3}$
   l. $1\frac{3}{4}$
   m. $2\frac{1}{2}$
   n. $3\frac{26}{45}$
   o. $3\frac{5}{6}$
   p. $37\frac{1}{2}$
   q. $\frac{27}{28}$
   r. $\frac{1}{4}$
   s. $3\frac{1}{4}$
   t. $2\frac{3}{8}$
   u. $21\frac{1}{3}$
   v. $\frac{9}{16}$
   w. $5\frac{1}{4}$
   x. 9
   y. $20\frac{4}{9}$
   z. $4\frac{5}{16}$

MIXED COMPUTATION OF FRACTIONS
UNIT VI

TEST

1. Match the following symbol or term with the operation.

_____ a. +

_____ b. x

_____ c. ÷

_____ d. −

_____ e. Invert; reciprocal

_____ f. multiply

_____ g. sum

_____ h. subtract

_____ i. product

_____ j. divide

_____ k. difference

_____ l. add

A. division

B. addition

C. multiplication

D. subtraction

2. Solve the problems. Simplify if possible

a. $\frac{1}{2}$ of 5

b. $\frac{2}{3}$ plus $1\frac{1}{3}$

c. $2\frac{3}{4}$ minus $\frac{2}{3}$

d. $\frac{2}{3}$ of 15

e. $1\frac{7}{8}$ plus $\frac{3}{8}$

f. 5 minus $\frac{7}{8}$

Solve the following problems as indicated by the sign.

g. $\frac{1}{2} + \frac{2}{3}$

h. $7 - \frac{2}{3}$

i. $\frac{2}{3} \times 1\frac{2}{3}$

j. $2\frac{3}{5} \div 3\frac{1}{2}$ k. $7\frac{1}{5} + 3\frac{1}{3}$ l. $3\frac{4}{5} - \frac{2}{8}$

m. $5\frac{1}{2} \times 4\frac{3}{8}$ n. $8\frac{1}{2} \div 3$ o. $3\frac{1}{2} + \frac{5}{8}$

p. $5\frac{1}{2} - 1\frac{3}{4}$ q. $3\frac{3}{8} \times 2\frac{1}{2}$ r. $2\frac{3}{8} \div 1\frac{1}{3}$

MIXED COMPUTATIONS OF FRACTIONS
UNIT VI

ANSWERS TO TEST

1. a. B
   b. C
   c. A
   d. D
   e. A
   f. C
   g. B
   h. D
   i. C
   j. A
   k. D
   l. B

2. a. $2\frac{1}{2}$
   b. 2
   c. $2\frac{1}{12}$
   d. 10
   e. $2\frac{1}{4}$
   f. $4\frac{1}{8}$
   g. $1\frac{1}{6}$
   h. $6\frac{1}{3}$
   i. $1\frac{1}{9}$
   j. $\frac{26}{35}$
   k. $10\frac{8}{15}$
   l. $3\frac{11}{20}$
   m. $24\frac{1}{16}$
   n. $2\frac{5}{6}$
   o. $4\frac{1}{8}$
   p. $3\frac{3}{4}$
   q. $8\frac{7}{16}$
   r. $1\frac{25}{32}$

FRACTION WORD PROBLEMS
UNIT VII

UNIT OBJECTIVE

After completion of this unit, the student should be able to solve fraction word problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Interpret fraction word problems into number problems.
2. Use estimation as a technique to determine the reasonableness of an answer involving fractions.
3. Use addition, subtraction, multiplication or division as appropriate in the solution of word problems involving fractions.

FRACTION WORD PROBLEMS
UNIT VII

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets

    1. Assignment Sheet #1--Interpret fraction word problems into number problems.

    2. Assignment Sheet #2--Use appropriate operation for the solution of word problems involving fractions.

    3. Assignment Sheet #3--Use estimation as a technique to determine the reasonableness of an answer involving fractions.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I. 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. _____________. Mathematics Skill Book 6600. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Company, 1983.

FRACTION WORD PROBLEMS
UNTI VII

INFORMATION SHEET

I. Terms and Definitions

   A. Addition--Key words which indicate this operation are sum, total, altogether, and combined.

   B. Subtraction--Key words which indicate this operation are difference, how much more, and how much less; gross and net often indicate subtraction.

   C. Multiplication-- Key words which indicate this operation are of (immediately followed by a fraction) and times.

   D. Division--Key words which usually indicate this operation are cut. share, split, divide, and per.

II. Solving word problems

   A. Read the problem carefully.

   B. Decide what the problem is asking.

   C. Decide which facts are necessary and which are not.

   D. Label the facts.

   E. Determine which operation(s) is needed through the use of key words.

   F. Set up the problem.

   G. Solve the problem.

   H. Label your answer with proper units.

   I. Check for the reasonableness of your answer by estimation.

   J. Check your answer by inserting your solution into the original problem.

III. Estimating Fractions

A. Round off the fraction to nearest whole number. If the fraction is less than ½, drop the fraction; the whole number remains the same. If the fraction is ½ or grater than ½, the whole number becomes one greater.

Example:

$2 \frac{1}{2}$ becomes 3

$2 \frac{1}{4}$ becomes 2

B. Solve the problem by the appropriate operation.

Example:

$2 \frac{1}{2} + 2 \frac{3}{4} =$

$3 + 3 = 6$ Estimated answer

$2 \frac{3}{4} \times \frac{1}{4} =$

$3 \times \frac{1}{4} = \frac{3}{1} \times \frac{1}{4} = \frac{3}{4}$ Estimated answer

FRACTION WORD PROBLEMS
UNIT VII

ASSIGNMENT SHEET #1--INTERPRET FRACTION WORD PROBLEMS INTO NUMBER PROBLEMS

Directions: Read the problem and decide which operation should be used to solve the problem. Then rewrite the problem as a number problem. Do not solve the problem.

1. a. Mary spent $\frac{1}{4}$ of her salary for rent, $\frac{3}{8}$ of her salary for food and $\frac{3}{16}$ of her income was spent on electricity. How much of her salary did she spend for these items?

   b. Johnny bought a length of bar stock 15 $\frac{3}{8}$ in. long. He cut a piece 5 $\frac{9}{16}$ in. from this length of bar stock. What is the length of the remaining stock?

   c. Sue spent $\frac{3}{4}$ of her day's pay, \$80, on a dress. How much did the dress cost?

   d. Bill cut a sheet of particle board 7 $\frac{1}{2}$ feet long into 4 equal pieces. How long is each piece?

   e. Sue worked 6 $\frac{1}{4}$ hours on Monday, 7 $\frac{1}{2}$ hours on Tuesday, 8 hours on Wednesday, 5 $\frac{2}{3}$ hours on Thursday, and 7 $\frac{3}{4}$ hours on Friday. How many hours did Sue work?

   f. Joe is 70 $\frac{1}{2}$ inches tall. His daughter is 1 $\frac{3}{4}$ inches shorter. How tall is his daughter?

g. Jane's weekly gross salary is \$312. One sixth of her salary is taken out for taxes and Social Security. What is Jane's take home pay

h. Betty bought a dozen doughnuts for \$2. How much did each doughnut cost?

i. A recipe for cornbread calls for $\frac{1}{2}$ teaspoon of salt, 1 cup of sifted cornmeal and $\frac{1}{2}$ cup of flour. Sue wants to double the recipe. How much salt will she need?

j. How many $\frac{1}{2}$ in. strips of wood can be cut from a piece of wood 74 inches long?

FRACTION WORD PROBLEMS
UNIT VII

ASSIGNMENT SHEET #2--USE APPROPRIATE OPERATION TO SOLVE WORD PROBLEMS

Directions: Solve the following word problems using the appropriate operation.

1. a. Jenny bought $7\frac{1}{2}$ yards of material. She used $3\frac{2}{3}$ yards to make a suit. How much material did she have left?

   b. Jim drove $2\frac{3}{4}$ miles to and from school each day of the school week. How many miles does he drive to and from school each week?

   c. There are 2,500 students in the school. One fourth of them are seniors. How many seniors are enrolled?

   d. Janie lives $1\frac{3}{4}$ miles farther from town than Jim. Jim lives $5\frac{2}{3}$ miles from town. How far does Janie live from town?

   e. Bob wants to cut a pipe $72\frac{1}{2}$ inches long into $2\frac{1}{2}$ inch long pieces. How many pieces can he cut from the pipe?

   f. Sue makes $5 an hour as a painter. She worked $10\frac{3}{4}$ hours on a job. How much did she make?

g. Bill and Mary drove $10\frac{2}{3}$ miles to Cherry Point, $5\frac{7}{8}$ miles from Cherry Point to White Flag, and $22\frac{1}{2}$ miles to Small Rock. How many miles did they drive altogether?

h. John bought 38 acres of farmland. He plans to plant $\frac{2}{3}$ of the land in pines. How many acres will he plant in pines?

i. Jim used $15\frac{7}{8}$ lb. of dog food from a 25 lb. bag. How much dog food is left in the bag?

j. Three friends went fishing. If they caught $18\frac{3}{4}$ pounds of fish, how many pounds did each friend take home?

FRACTION WORD PROBLEMS
UNIT VII

ASSIGNMENT SHEET #3--ESTIMATION IN FRACTION WORD PROBLEMS

Directions: Estimate the answers to the following problems by rounding. Then find the exact answer.

1. a. $2\frac{1}{3} + 7\frac{3}{4} =$ b. $2\frac{3}{4} \times \frac{1}{4} =$

c. $\frac{3}{4} \div \frac{1}{4} =$ d. $3\frac{1}{4} + 2\frac{1}{8} =$

e. $2\frac{1}{5} \times 3\frac{2}{3} =$ f. $2\frac{3}{4} + 3\frac{4}{5} =$

g. $7\frac{2}{3} - 2\frac{1}{4} =$ h. $5\frac{5}{6} + 1\frac{1}{2} =$

i. $1\frac{1}{3} \div \frac{1}{2} =$ j. $1\frac{3}{4} \div \frac{1}{4} =$

FRACTION WORD PROBLEMS
UNIT VII

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

a. $\frac{1}{4} + \frac{3}{8} + \frac{3}{16}$

b. $15\frac{3}{8} - 5\frac{9}{16}$

c. $\frac{3}{4} \times \$80$

d. $7\frac{1}{2} \div 4$

e. $6\frac{1}{4} + 7\frac{1}{2} + 8 + 5\frac{2}{3} + 7\frac{3}{4}$

f. $70\frac{1}{2} - 1\frac{3}{4}$

g. $\frac{1}{6} \times 312$

h. $24\overline{)\,2.00}$

i. $2 \times \frac{1}{2}$

j. $74 \div \frac{1}{2}$

ASSIGNMENT SHEET #2

a. $3\frac{5}{6}$ yards

b. $13\frac{3}{4}$ miles

c. 625 seniors

d. $7\frac{5}{12}$ miles

e. 29

f. $53.75

g. $39\frac{1}{24}$ miles

h. $25\frac{1}{3}$ acres

i. $9\frac{1}{8}$ pounds

j. $6\frac{1}{4}$ pounds

ASSIGNMENT SHEET #3

a. 10, $10\frac{1}{2}$

b. $\frac{3}{4}$, $\frac{11}{16}$

c. 4, 3

d. 5, $5\frac{3}{8}$

e. 8, $8\frac{1}{15}$

f. 7, $6\frac{11}{20}$

g. 6, $5\frac{5}{12}$

h. 8, $7\frac{1}{6}$

i. 2, $2\frac{2}{3}$

j. 8, 7

FRACTION WORD PROBLEMS
UNIT VII

TEST

1. Directions: Read the problem and decide which operation should be used to solve the problem. Rewrite the problem as a number problem and solve the problem.

a. John bought a turkey weighing 10 $\frac{7}{8}$ pounds. He ate $\frac{2}{3}$ of the turkey. How many pounds did he eat?

b. Mary bought a bag of nails which weighed 1 $\frac{3}{4}$ pounds. Mary gave Sue $\frac{1}{2}$ pound of nails. How much did the bag weigh then?

c. Pete had a bag of candy weighing $\frac{3}{4}$ pounds. How many bags of candy will he have if each bag weighs $\frac{1}{4}$ of a pound?

d. If workers cut a doorway 2 $\frac{1}{2}$ feet wide in the center of a wall which is 17 $\frac{3}{4}$ feet long, how long is the remaining wall along its base?

e. In 1970, there were 2 $\frac{1}{2}$ thousand people in Sourwood. In 1980, there were 4 $\frac{1}{4}$ thousand people. How much did Sourwood's population grow from 1970 to 1980?

164-B

2. Directions: Estimate the answers to the following problems by rounding.

   a. $2\frac{1}{2} \times 3\frac{1}{4} =$

   b. $3\frac{2}{3} \div \frac{1}{8} =$

   c. $4\frac{3}{4} + 2\frac{1}{3} =$

   d. $5\frac{1}{4} - 2\frac{3}{16} =$

   e. $3\frac{7}{8} + 1\frac{1}{16} =$

3. Directions: Find the exact answers to the problems in problem number two.

   a.____________________

   b.____________________

   c.____________________

   d.____________________

   e.____________________

FRACTION WORD PROBLEMS
UNIT VII

ANSWERS TO TEST

1. a. (x); $7\frac{1}{4}$ b. (-); $1\frac{1}{4}$

   c. (÷); 3 d. (-); $15\frac{1}{4}$

   e. (-); $1\frac{3}{4}$

2. estimations:

   a. 9 b. 32

   c. 7 d. 3

   e. 5

3. exact answers:

   a. $8\frac{1}{8}$ b. $29\frac{1}{3}$

   c. $7\frac{1}{12}$ d. $3\frac{1}{16}$

   e. $4\frac{15}{16}$

RATIO AND PROPORTION

UNIT VIII

UNIT OBJECTIVE

After completion of this unit, the student should be able to determine ratio and proportion with given data. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Compare similar quantities by means of ratio.
2. Compare similar quantities by means of proportion.
3. Solve pre-set proportions.

RATIO AND PROPORTION

UNIT VIII

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets-
  - 1. Assignment Sheet #1--Simple ratios
  - 2. Assignment Sheet #2--Proportions
  - 3. Assignment Sheet #3--Pre-set Proportions
- D. Answers to Assignment Sheets
- E. Test
- F. Answers to test

II. References

A. Chant, Alfred E., Barbara J. Montalto and Barbara A. Enfinger. Reaching Math Competence New York, NY: Globe Book Company, Inc., Cambridge Division. 1981.

B. Kerr, Donald J., Jr. Elementary Algebra New York, NY: McGraw-Hill, 1980.

C. Olivo, C. Thomas and Thomas P. Olivo. Basic Mathematics Simplified, 4th Edition. Albany, NY: Delmar Publishers Incorporated, 1977.

D. Shea, James T. Algebra Austin, TX: Steck-Vaughn Company, 1975.

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RATIO AND PROPORTION

UNIT VIII

INFORMATION SHEET

I. Terms and definitons

   A. Ratio--a comparison of two similar quantities by division

   B. Proportion--two equal ratios

   C. Extreme--the first and last terms of a proportion

   D. Means--the second and third terms of a proportion

   (Note: Expressed as extreme:mean = mean:extreme)

   E. Similar--close comprison

II. Procedures:

   A. Ratio--a means of comparing two quantities

   Example: Fred is 20 years old; Bill is 40 years old

   1. Fred is 20 years younger than Bill:

```
  40  Bill
- 20  Fred
__________
  20 years difference
```

   2. Using ratio, this comparison is made by division:

   Step 1: Compare Bill's age to Fred's age

   $\frac{40}{20}$ (Bill's age compared to Fred's age)

   Step 2: Reduce

   (40/20) ÷ 20 = 2/1

   Step 3: Ratio of 2:1 is comparison of Bill's age to Fred's age

(NOTE: The following example illustrates the comparison of Fred's age to Bill's age.)

Step 1: $\frac{20}{40}$

Step 2: Reduce

(20/40) % 20 = 1/2

Step 3: Ratio of Fred to Bill is 1:2

B. Proportion--two equal ratios form a proportion. Thus the ratios of 4 to 5 and 40 to 50 form a proportion which is written 4:5 and 40:50. This is read "four is to five as forty is to fifty".

(NOTE: The first and last terms of a proportion are called the extremes and the second and third terms are called the means.)

Example:

$$\begin{array}{ccccccc} 4 & : & 5 & = & 40 & : & 50 \\ \text{extreme} & & \text{mean} & & \text{mean} & & \text{extreme} \end{array}$$

(NOTE: The product of the extremes equals the product of the means. extreme x extreme = mean x mean)

Example:

$$\begin{array}{ccccccc} 4 & \times & 50 & = & 50 & \times & 5 \\ \text{extreme} & \times & \text{extreme} & = & \text{mean} & \times & \text{mean} \\ & 200 & & = & & 200 & \end{array}$$

C. Rearrangement of proportions--proportions solved by cross multiplication

Example: 4:5 = 40:50

Step 1: Rewrite as: $\frac{4}{5} = \frac{40}{50}$

Step 2: Cross multiply: $\frac{4}{5} = \frac{40}{50}$

becomes 4 x 50 = 5 x 40

Step 3: Multiply: 4 x 50 = 200
5 x 40 = 200
200 = 200

RATIO AND PROPORTION

UNIT VIII

ASSIGNMENT SHEET #1--SIMPLE RATIOS

1. A pole is 20 feet tall and a tree is 50 feet tall. What is the ratio of the pole to the tree?

2. In the previous problem, what is the ratio of the tree to the pole?

3. Jim is 20 years old; his father is 40 years old. What is the ratio of Jim's age to his father's age?

4. Fred is 6 ft. tall; Joe is 30" tall. What is the ratio of Fred's height to Joe's height?

5. In the previous problem, what is the ratio of Joe's height to Fred's height?

6. The length of a tool is 8"; the length of a second tool is 24". What is the ratio of the first tool to the second tool?

7. The distance to Little Rock is 100 miles. The distance to Memphis is 150 miles. What is the ratio of the distance to Little Rock to the distance to Memphis?

RATIO AND PROPORTION

UNIT VIII

ASSIGNMENT SHEET #2--PROPORTIONS

1. The ratio of the height of a pine tree to an oak is 3:1. If the pine is 30 ft. tall, how tall is the oak?

2. The ratio of Brad's age to April's age is 7:6. If Brad is 14 years old, how old is April?

3. The ratio of a son's age to his father's age is 2:3. If the son is 40 years old, how old is the father?

4. If a man can walk 15 miles in 6 hrs., how far can he walk in 10 hours?

5. A car is traveling at the rate of 45 miles per hour. At the same speed, how far will it travel in 12 minutes?

6. A flagpole casts a 210 ft. shadow. At the same time, a tree 20 ft. tall casts a shadow of 30 feet. How tall is the pole?

7. Brad is 6 ft. tall. His shadow was 4 feet long when the shadow of a building was 100 feet. How tall is the building?

RATIO AND PROPORTION

UNIT VIII

ASSIGNMENT SHEET #3--PRE-SET PROPORTIONS

Directions: Solve for X in the following problems.

1. 25:3 = 75:X
2. 5:12 = 10:X
3. 7:9 = 21:X
4. 10:X = 5:12
5. 8:X = 4:15
6. 5:4 = 20:X
7. 12:4 = X:7
8. 6:9 = X:3
9. 7:3 = X:6
10. X:4 = 5:10
11. X:20 = 4:5
12. X:100 = 3:25
13. X:3.2 = 5:8
14. 6:7 = X:14
15. X:3 = 10:15
16. $\frac{X}{8} = \frac{5}{4}$
17. $\frac{X}{16} = \frac{3}{8}$
18. $\frac{X}{6} = \frac{5}{3}$

19. $\frac{X}{9} = \frac{1}{3}$

20. $\frac{X}{3} = \frac{2}{5}$

21. $\frac{X}{12} = \frac{1}{6}$

22. $\frac{2X}{3} = \frac{16}{5}$

23. $\frac{6.5}{5} = \frac{13}{X}$

24. $\frac{5}{3} = \frac{25}{X}$

RATIO AND PROPORTION

UNIT VIII

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. 2:5
2. 5:2
3. 1:2
4. 9:10
5. 10:9
6. 1:3
7. 1:1.5 or 1:1 1/2

Assignment Sheet #2

1. 10 ft.
2. 12 years old
3. 60 years old
4. 25 miles
5. 9 miles
6. 140 ft. tall
7. 150 ft. tall

Assignment Sheet #3

1. 9
2. 24
3. 27
4. 24
5. 30
6. 16
7. 21
8. 2
9. 14
10. 2
11. 16
12. 12
13. 2
14. 12
15. 2
16. 10
17. 6
18. 10
19. 3
20. 1 1/5
21. 2
22. 3
23. 10
24. 15

RATIO AND PROPORTION

UNIT VIII

TEST

1. The length of a rectangle is 45 feet and the width is 15 feet. What is the ratio of the width to the length?

2. a. Bill and Larry have $2.40 and the amount each one has is in the ratio or 5:3. How much does each have?

   Bill _______ Larry _______

   b. If a car uses 6 gallons of gas to go 80 miles, how much gas will be needed to go a distance of 120 miles? (Assume the gas consumption rate will remain constant.)

3. Solve for X in the following proportions:

   a. X:21 = 2:3

   b. 5:1 = 30:X

   c. 12:X = 16:4

   d. 7:X = 28:8

   e. 35:14 = 50:X

   f. 4:X = 6:12

   g. 35:14 = 50:X

   h. 4:X = 16:12

   i. 8:X = 12:6

   j. $\frac{21}{75} = \frac{X}{25}$

   k. $\frac{3}{9} = \frac{X}{16}$

l. $\frac{27}{X} = \frac{15}{10}$

m. $\frac{27}{X} = \frac{20}{10}$

n. $\frac{20}{19} = \frac{30}{X}$

o. $\frac{X}{3} = \frac{7}{5}$

p. $\frac{3}{X} = \frac{5}{2}$

q. $\frac{16}{X} = \frac{8}{3}$

r. $\frac{9}{15} = \frac{X}{5}$

RATIO AND PROPORTION

UNIT VIII

ANSWERS TO TEST

1. 3:1

2. a. Bill $1.50; Larry $.90

   b. 9 gals.

3. a. 14
   b. 6
   c. 3
   d. 2
   e. 20
   f. 8
   g. 20
   h. 3
   i. 4
   j. 7
   k. 5 1/3
   l. 18
   m. 13.5
   n. 28.5
   o. 7
   p. 1.2 or 1 1/5
   q. 6
   r. 3

DECIMAL NOTATION
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to interpret decimal notation. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Name the place value of decimal numbers to 6 digits.
2. Write decimals up to 6 digits.
3. Determine the higher or lower value of given decimals.
4. Round off decimal numbers.

DECIMAL NOTATION
UNIT I

SUGGESTED ACTIVITIES

I. Make transparency.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate decimal place value names with transparency.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Transparency master--Decimal place value chart

  D. Assignment sheets-

    1. Assignment Sheet #1--Read decimals

    2. Assignment Sheet #2--Write decimal numbers and word forms of decimals

    3. Assignment Sheet #3--Compare size of decimals

    4. Assignment Sheet #4--Round off decimal numbers

  E. Answers to assignment sheets

F. Test

G. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________ Mathematics Skill Book 7700. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Co., 1983.

DECIMAL NOTATION
UNIT I

INFORMATION SHEET

I. Terms and Definitions

A. Digit--Any numerical symbol from 0 to 9. These were originally called digits because they can be counted on the fingers.

B. Face Value--The value the digit actually says.

C. Place Value--The value or meaning of a digit based on its position or place in a numeral.

D. Decimal Point--A period used to separate the whole number part from the fractional part of a numeral, read as "and".

E. Round-off--To find an approximate number instead of an exact number.

F. Round-down--Where the approximate number is less than the original number.

G. Round-up--Where the approxiamte number is greater than the original number.

H. Literal form--Number words used to describe a decimal number.

I. Numeric form--Numerals used to describe a decimal number.

II. Word forms of Numbers

Tenths - 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9

Hundredths - 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09

Thousandths - 0.001, ..., 0.009

Ten-Thounsands - 0.0001, ..., 0.0009

Hundred-Thousandths - 0.00001, ..., 0.00009

Millionths - 0.000001, ..., 0.000009

III. Place Value

A.

units/ones		tenths	hundredths	thousandths	ten-thousandths	hundred-thousandths	millionths
____	.	____	____	____	____	____	____

B. To find the value of a digit:

1. Name the place of the digit.

2. Multiply the digit by its place value.

Example: To find the value of 6 in 0.036

1. Name the place value of 6; in this case, the thousandth place.

2. Multiply 6 by the place; in this case, 6 times one thousandth gives six thousandths.

IV. A. To read the decimal to six places

1. Starting at the first digit to the right of the decimal, read the numbers to the right, to the last digit, like a whole number.

Example:	0.00361	three hundred sixty-one
	0.105	one hundred five

2. Go to the furthest right digit. Determine its plaec value.

Example: 0.0001 ten thousandths

3. Now combine steps 1 and 2 to read a decimal.

Example: 0.0547 The last place is the ten-thousandths place and the number is five hundred forty-seven. This gives five hundred forty-seven ten-thousandths.

(NOTE: Place hyphens to show grouping of terms.)

B. To read mixed decimals

1. Read the whole number part (the part to the left of the decimal point).

2. Read the decimal part (the part to the right of the decimal point).

3. Combine the two parts by the word "and" between each part.

   Example: 34.005 = thirty-four and five thousandths

V. Write Decimals

A. To change decimal from literal form to numerical form

1. As you read the literal form, look for the word "and", as this word will be the decimal point.

2. Read the literal form to the left of the word "and" and write this down. Place the decimal point after the right digit.

   Example: thirty-three and fifty-one ten-thousandths--33.

3. Read the part to the right of the word "and". Note the place value of this part. To write this part: Start at that place value and write the number to the left.

   Example: thirty-three and fifty-one ten-thousandths

   33.__ __ 5 1

   ten-thousandths

4. If the number doesn't extend to the decimal point, then you must put zero place holders in the blank spots.

   Example: 34. 0 0 51
   zero place holders

B. To write the literal form of a numeric number

1. Read the number. The part to the left of the decimal is the whole number part. The part to the right of the decimal is the decimal part of the number.

2. As you read the whole part, write it down. At the end of the whole number part, comes the decimal and the word "and".

   Example: 57.13345 gives fifty-seven and

3. Determine the place value of the decimal part. Read the number from the decimal to that place value as you would a whole number and then attach the plaec value behind it.

   Example: 57.13345--hundred thousandths

   fifty-seven and thirteen thousand three hundred forty-five hundred-thousandths

   (NOTE: Hyphens are used to group common words together.)

VI. Comparing Decimals

A. As you move from the right to the left the digits have a larger plaec value.

   Example: 0.1 is greater than 0.04 or 0.001 is greater than 0.0005.

B. Read your numbers. If any of the numbers have whole number parts, then the greater the whole number, the greater the entire number.

   Example: 34.12 and 30.78
   34 is greater than 30, so 34.12 is greater than 30.78

4. If greater than five (51, 52, 53, etc.) increase the digit by one. Once this is understood, you may wish to combine rules 1 and 4 into the following: If greater than five (not five exactly) increase the marked digit by one (1).

Example: Round to the nearest 1/1000 (x.xxx)

$0.12\underline{5}6$ becomes 0.126 per rule B.1.

$0.12\underline{5}7$ becomes 1.126 per rule B.1.

$0.12\underline{5}4$ remains o.125 per rule B.2.

$0.12\underline{5}5$ becomes 0.126 per rule B.3 (marked digit is odd).

$1.12\underline{4}50$ remains 0.124 per rule B.3 (marked digit is even).

$0.12\underline{4}51$ becomes 0.125 per rule B.4 (51 is greater than 5).

(NOTE: The following is an explanation of formats and conventions involved in rounding-off when using metrics.)

D. Foreign and Metric Formats

1. Metric countries do not use a decimal point, but rather a decimal comma instead.

Example: One and five hundred thousandths millimeters would be written 1.500 mm in this country. If you were to read the same number in a manual published in a metric country (Japan or Germany, for example) it would be written as 1,500 mm.

2. Metric countries have used a period in the same way we use commas to separate thousandths. It would not be surprise to see a house selling for $65,500.95 for example, but seeing it expressed as $65.500,95 would be a surprise--even though they mean exactly the same thing.

   a. Because of this confusion, the trend in all countries is to eliminate commas and periods as place holders and use a space

C. If the whole number parts are equal, then you must compare the decimal part of the number. To compare the decimal part, determine the first left digit's place value in each number. Compare the place values as we did in part A.

Example: 0.03, 0.003, 0.3
hundredths, thousandths, tenths
So, 0.3 is the greatest, 0.03 is next to greatest, and 0.003 is the least.

D. If the decimal part of two numbers have the same place value, then the digit's face value determines the greater number. If the face value is the same, move to the next digit to the right, and compare to determine the size.

Example:	0.5 and 0.7 tenths, tenths	7 is greater than 5, so 0.7 is greater than 0.5.
	0.036 and 0.031	The 3's are equal, so we compare 6 and 1, 6 is greater than 1, so 0.036 is greater than 0.031.

VII. Round-off Decimals

A. Determine where to round-off to. If it says to the nearest thousandth, then this means the answer must be expressed down to thousandths and not a number less than that.

B. Determine which is the digit in the place value that we are rounding to, and mark it (perhaps by underlining the digit).

C. Look at the digit to the right of the digit you marked in B above.

1. If it is six (6) or greater, increase the marked digit by one (1).
2. If it is four (4) or less, leave the digit unchanged.
3. If it is five exactly (5 or 50), leave unchanged if even; increase by one (1) if odd.

F. Numbers Less than One

1. The convention covering numbers less than one is to put a zero (0) in the unit's place, so that it is clear to all concerned that the number is in fact less than one.

   Example: 0.375 is preferred, not .375

   0.5 is preferred, not .5

instead. In this case, the price of the house would be written $65 500.95 in this country and $65 500,95 in a metric country.

b. This same format is being seen more and more in expressing decimals with more than three places.

Example: 0.984 375 is preferred over 0.984375

E. Reducing Decimals

1. In some circumstances it may be said that 0.700 could be reduced to 0.7 or 7/10 but machinists, precision mechanics and engineers would be very reluctant to do so unless they were merely estimating. The rason is that when you say something measures 0.700", it probably does not mesure 0.700" exactly, but probably is somewhere between 0.699 6 and 0.700 4". Likewise, saying something measures 0.70" you are saying that it is greater than 0.69" and less than 0.71", but that if someone were to measure it to the nearest 0.001" that it might actually measure 0.704" or 0.698".

2. Looking at the problem another way, depending on the craft, certain tolerances are understood. For example, if a measurement is given as a fraction, ± 1/64" would be a reasonable assumption. Thus, saying that something measured 1/2" would imply that it is somewhere between 31/64" and 33/64". A three-place decimal implies a tolerance of ± 0.005" so saying something should measure 0.500" would imply that anything between 0.495" and 0.505" would be acceptable.

   We can see then how 1/2" is not the same as 0.5", 0.50", o.500" or 0.500 0" and because of this it would be fairly easy to cut a piece of pipe 1/2" long, but it could be much more difficult (and expensive) to have a piece of pipe cut to 0.500 0" long where the assumed tolerance would be ± 0.000 5" (1/2-thousandth of an inch.)

DECIMAL NOTATION
UNIT I

ASSIGNMENT SHEET #1--READ DECIMALS

Directions: Read the list in Column A and find the decimal in Column B that represents it. Place the letter from Column B in the space provided in Column A.

Column A	Column B
_____1. Seven and seven hundredths	a. 7.702
_____2. Seven and five thousand seven ten-thousandths	b. 7.70007
_____3. Seven and seven hundred thousand seven millionths	c. 7.07
_____4. Seven and seven hundred two thousandths	d. 7.007
_____5. Seven and seven tenths	e. 7.5007
_____6. Seven and seven thousandths	f. 7.0057
_____7. Seven and seventy thousand seven hundred-thousandths	g. 7.700007
_____8. Seven and fifty-seven ten-thousandths	h. 7.7

Directions: Read the list in Column A and find the word numbers that represent the decimals in Column A. Place the letter from Column B in the space provided in Column A.

Column A	Column B
_____1. 2.2	a. Two hundred two thousandths
_____2. 0.002	b. Two and two millionths
_____3. 0.2002	c. Two and two tenths
_____4. 2.0022	d. Two and twenty-two ten thousandths
_____5. 2.022	e. Two and two hundred-thousandths

_____6. 0.202 f. Two and twenty-two thousandths

_____7. 2.00002 g. Two thousand two ten-thousandths

_____8. 2.000002 h. Two thousandths

DECIMAL NOTATION
UNIT I

ASSIGNMENT SHEET #2--WRITE DECIMAL NUMBERS AND WORD FORMS OF DECIMALS

Directions: In the space provided write the decimal that represents the given word number.

Example: Fifteen and twenty-three ten-thousandths - 15.0023

1. a. Three and fifty-five ten-thousandths __________

   b. Eighteen and three hundred seventy-five thousandths __________

   c. Two hundred five hundred-thousandths __________

   d. Thirteen hundredths __________

   e. Twenty-six millionths __________

   f. Five and five hundred thousand eighty-seven millionths __________

   g. One hundred thirty and seventy-eight hundredths __________

Directions: With the following given decimals write the word numbers in the space provided. Be sure to include any hyphens.

Example: .151 One hundred fifty-one thousandths

2. a. 5.3 ______________________________

   b. 1.007 ______________________________

   c. 0.1038 ______________________________

   d. 2.5008 ______________________________

e. 0.00091 ____________________________________

f. 0.000328 ____________________________________

g. 3.00304 ____________________________________

h. 0.73031 ____________________________________

DECIMAL NOTATION
UNIT I

ASSIGNMENT SHEET #3--COMPARE SIZE OF DECIMALS

Directions: Arrange the following decimals by size, starting with the smallest decimal first and the largest decimal last.

Example: 0.501, 0.72, 0.13, 0.5

0.13, 0.5, 0.501, 0.72

a. 1.2, 0.8, 0.2, 2.5, 1 ____________________

b. 0.5, 0.49, 0.6, 0.51, 0.501 ____________________

c. 1.4, 0.4, 1.3, 1.44, 1.39, 1.04 ____________________

d. 0.879, 0.079, 0.579, 0.87, 0.8791 ____________________

e. 5.03, 0.53, 50.3, 0.053, 5.3 ____________________

f. 0.5001, 0.5, 0.502, 0.51, 0.501 ____________________

g. 0.5, 0.3, 0.7, 1.0, 0.8 ____________________

h. 0.01, 0.1, 0.02, 0.2, 0.15 ____________________

i. 0.03, 0.2, 0.05, 0.25, 0.35 ____________________

j. 1.03, 0.103, 0.130, 1.30, 10.3 ____________________

k. 0.22, 0.42, 0.24, 0.02, 0.2 ____________________

l. 0.17, 0.24, 0.22, 0.20, 0.25 ____________________

n. 0.000589 (hundred-thousandths) = _______

o. 0.01385 (thousandths) = _______

p. 0.0560893 (millionths) = _______

q. 0.1509045 (millionths) = _______

r. 0.457007 (hundred-thousandths) = _______

s. 0.580079 (tenths) = _______

t. 0.234067 (hundredths) = _______

u. 0.780556 (ten-thousandths) = _______

v. 5.021235 (thousandths) = _______

w. 0.29955 (thousandths) = _______

x. 0.95 (tenths) = _______

DECIMAL NOTATION
UNIT I

ASSIGNMENT SHEET #4--ROUND OFF DECIMAL NUMBERS

Directions: Round off the following decimal numbers to the indicated place values.

Example: 13.48 (tenths) = 13.5

a. 3.55 (tenths) = ______

b. 5.58 (tenths) = ______

c. 0.63 (tenths)= ______

d. 0.80 (tenths)= ______

e. 1.1358 (hundredths) = ______

f. 0.453 (hundredths)= ______

g. 1.504 (hundredths) = ______

h. 0.5498 (thousandths) = ______

i. 0.00118 (thousandths)= ______

j. 0.09951 (thousandths)= ______

k. 0.00001 (thousandths)= ______

l. 1050.995 (hundredths) = ______

m. 0.00058 (ten-thousandths)= ______

DECIMAL NOTATION
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

	Set I	Set II
1.	c	c
2.	e	h
3.	g	g
4.	a	d
5.	h	f
6.	d	a
7.	b	e
8.	f	b

ASSIGNMENT SHEET #2

1. a. 3.0055
   b. 18.375
   c. 0.00205
   d. 0.13
   e. 0.000026
   f. 5.500087
   g. 130.78

2. a. five and three tenths
   b. one and seven thousandths
   c. one thousand thirty-eight ten-thousandths
   d. two and five thousand eight ten-thousandths
   e. ninety-one hundred-thousandths
   f. three hundred twenty-eight millionths
   g. three and three hundred four hundred-thousandths
   h. seventy-three thousand thirty-one hundred-thousandths

ASSIGNMENT SHEET #3

a. 0.2, 0.8, 1, 1.2, 2.5
b. 0.49, 0.5, 0.501, 0.51, 0.6
c. 0.4, 1.04, 1.3, 1.39, 1.4, 1.44
d. 0.079, 0.579, 0.87, 0.879, 0.8791
e. 0.053, 0.53, 5.03, 5.3, 50.3
f. 0.5, 0.5001, 0.501, 0.502, 0.51
g. 0.3, 0.5, 0.7, 0.8, 1.0
h. 0.01, 0.02, 0.1, 0.15, 0.2
i. 0.03, 0.05, 0.2, 0.25, 0.35
j. 0.103, 0.130, 1.03, 1.30, 10.3
k. 0.02, 0.2, 0.22, 0.24, 0.42
l. 0.17, 0.20, 0.22, 0.24, 0.25

ASSIGNMENT SHEET #4

a. 3.6
b. 5.6
c. 0.6
d. 0.8
e. 1.14
f. 0.45
g. 1.50
h. 0.550
i. 0.001
j. 0.100
k. 0.000
l. 1051.00
m. 0.0096
n. 0.00059
o. 0.014
p. 0.056089
q. 0.150905
r. 0.45701
s. 0.6
t. 0.23
u. 0.7806
v. 5.021
w. 0.300
x. 1.0

DECIMAL NOTATION
UNIT I

TEST

I. Directions: Read the list in Column I and find the decimal in Column II that represents it. Place the letter from Column II in the space provided in Column I.

Column I	Column II
_____1. one thousand two hundred one ten-thousandths	a. 0.1210
_____2. twelve and one hundred ten-thousandths	b. 0.0121
_____3. one and two hundred ten thousandths	c. 12.11
_____4. one thousand two hundred ten ten-thousandths	d. 1.210
_____5. twelve and eleven hundredths	e. 12.0100
_____6. one hundred twenty-one ten-thousandths	f. 0.1201

II. Directions: In the space provided write the decimal numbers for the given word forms.

1. three hundred fifty-four thousandths __________
2. thirteen ten-thousandths __________
3. seventy-five thousand five hundred millionths __________
4. five and seven thousand eight hundred seventy-nine ten-thousandths __________
5. thirteen thousand five hundred hundred-thousandths __________
6. eighty-four and seven tenths __________

III. Directions: Arrange the following decimals by size, starting with the smallest decimal first and the largest decimal lat.

1. 0.5, 0.7, 0.08, 0.51, 0.69 ____________________

2. 0.058, 0.050, 0.06, 0.05 ____________________

3. 0.0017, 0.0016, 0.00175, 0.00177 ____________________

4. 1.0017, 2.0005, 1.9004, 0.9894 ____________________

5. 1.24, 1.22, 1.25, 1.227, 1.248 ____________________

6. 0.601, 0.6, 0.602, 0.62, 0.6005 ____________________

IV. Directions: Round off the following decimal numbers to the indicated place values.

1. 2.56 (tenths) __________
2. 0.013 (hundredths) __________
3. 1.0586 (thousandths) __________
4. 0.5793 (tenths) __________
5. 0.345 (hundredths) __________
6. 0.895 (hundredths) __________
7. 0.5007 (ten-thousandths) __________
8. 0.5671358 (millionths) __________
9. 7.013467 (ten-thousandths) __________
10. 0.4995 (thousandths) __________

DECIMAL NOTATION
UNIT I

ANSWERS TO TEST

Part I

1. f
2. e
3. d
4. a
5. c
6. b

Part II

1. 0.354
2. 0.0013
3. 0.075500
4. 5.7879
5. 0.13500
6. 84.7

Part III

1. 0.08, 0.5, 0.51, 0.69, 0.7
2. 0.050, 0.051, 0.058, 0.06
3. 0.0016, 0.0017, 0.00175, 0.00177
4. 0.9894, 1.0017, 1.9004, 2.0005
5. 1.22, 1.227, 1.24, 1.248, 1.25
6. 0.6, 0.6005, 0.601, 0.602, 0.62

Part IV

1. 2.6
2. 0.01
3. 1.059
4. 0.6
5. 0.35 or 0.34 (rounded per A.S.A.)
6. 0.90
7. 0.5007
8. 0.567136
9. 7.0135
10. 0.500

ADDITION OF DECIMALS
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to add decimals. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Align decimal numbers into columns for addition.
2. Add decimals.

ADDITION OF DECIMALS
UNIT II

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Align decimals.

    2. Assignment Sheet #2--Add decimals.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

  A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

  B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. _________________ Mathematics Skill Book 7700.
Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics.
Albany, NY 12205: Delmar Publishing Co., 1983.

ADDITION OF DECIMALS
UNIT II

INFORMATION SHEET

I. Addition of Decimals

A. Align the decimal numbers in a columnar form. Be sure to line up the decimal points one over another and to line up each place value.

Example: Add .031, 4.079, and .12

$$\begin{array}{r} .12 \\ 4.079 \\ +\ .031 \\ \hline \end{array}$$

B. Bring down the decimal point. Next, start at the extreme right place value and add each column of digits, placing the partial sums below. If a partial sum is 10 or above be sure to carry the first digit.

Example:

$$\begin{array}{r} .12 \\ 4.079 \\ +\ .031 \\ \hline 4.230 \end{array}$$

ADDITION OF DECIMALS
UNIT II

ASSIGNMENT SHEET #1--ALIGN DECIMALS FOR ADDITION

Directions: Align the following decimals into columns for addition. You do not need to add the numbers.

Example: 15.2 + 3.156 + 2.8 = 15.2
3.156
2.8

1. 15.065 + 13.1004 + 5.6 =

2. 19.005 + 16.007 + 17.0608 =

3. 1.4005 + 1.4003 + 1.3997 =

4. .978 + .979 + .976 + .975 =

5. .1001 + .23789 + .0589 + .6 =

6. .678 + .0571 + .00871 + .90005 =

7. .000013 + .00078 + .000084 + .1 =

8. .000005 + .00007 + .000006 + .00003 =

9. 5.001 + 6.0001 + 7.01 + 3.1 =

10. 143.1 + 13.56 + 15.305 + 0.01 =

ADDITION OF DECIMALS
UNIT II

ASSIGNMENT SHEET #2--ADD DECIMALS

Directions: Add the following decimals and don't forget your decimal point.

1.	a. .15 .100 + 4	b. 1.56 .02 + 5.309	c. 5.8 6.0007 + 5.3001	d. 1.3005 .210537 + .300000
	e. 3.70867 2.01012 + 1.99999	f. 2.36552 1.33045 + .00909	g. 348.1001 1007.064 + 156.37	h. .103 56.78 1300 + 921.4

2.	a. 137. + 15.8	b. 216.53 + 1.9	c. 372. + 135.006	d. 128.9 + 19.8
	e. 214.08 + 17.9	f. 263.0005 + 17.601	g. 1.046 + .87	h. 73.1 + 1.53

ADDITION OF DECIMALS
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. $$\begin{array}{r} 15.065 \\ 13.1004 \\ \underline{5.6} \end{array}$$

2. $$\begin{array}{r} 19.005 \\ 16.007 \\ \underline{17.0608} \end{array}$$

3. $$\begin{array}{r} 1.4005 \\ 1.4003 \\ \underline{1.3997} \end{array}$$

4. $$\begin{array}{r} .978 \\ .979 \\ .976 \\ \underline{.975} \end{array}$$

5. $$\begin{array}{l} .1001 \\ .23789 \\ .0589 \\ \underline{.6} \end{array}$$

6. $$\begin{array}{l} .678 \\ .0571 \\ .00871 \\ \underline{.90005} \end{array}$$

7. $$\begin{array}{l} .000013 \\ .00078 \\ .000084 \\ \underline{.1} \end{array}$$

8. $$\begin{array}{l} .000005 \\ .00007 \\ .000006 \\ \underline{.00003} \end{array}$$

9. $$\begin{array}{l} 5.001 \\ 6.0001 \\ 7.01 \\ \underline{3.1} \end{array}$$

10. $$\begin{array}{r} 143.1 \\ 13.56 \\ 15.305 \\ \underline{0.01} \end{array}$$

ASSIGNMENT SHEET #2

1.
   - a. 4.250
   - b. 6.889
   - c. 17.1008
   - d. 1.811037
   - e. 7.71878
   - f. 3.70506
   - g. 1511.5341
   - h. 2278.283

2.
   - a. 152.8
   - b. 218.43
   - c. 507.006
   - d. 148.7
   - e. 231.98
   - f. 280.6015
   - g. 1.916
   - h. 74.63

ADDITION OF DECIMALS
UNIT II

TEST

1. Align the following decimals for addition; then add the problems.

   a. .531, .706, and .35

   b. 1.03 + 5.07 + 6.04 =

   c. .781 plus .8051 plus .7973 =

   d. Total 5, 13.5, 18.001

   e. Find the sum of 3.125, 4.5, 5 and 5.25

   f. Add .007, .0005, .0008, and .0063

2. Add the following:

a. .345
.4
+ .576

b. .74
3.5
+ 15

c. 17.578
5.2
+ .305

d. 7.9003
12.4787
+ 5.3001

e. 156.532
78
+ 921.7

f. .000052
.000047
+ .00005

g. 3.9671
2.7873
+ 3.2456

h. .003
.05
+ .7

i. 4.07
.005
+ 5.3

40-C

j. 78.874
324.75
+1201.5

k. 183.3
5
+ .0006

l. 3.05
2.0003
+1.4005

m. 1.400
1.399
+1.403

n. 2.0004
.9998
+1.0003

o. .00032
.00027
.0004
+.0003

p. .99997
1.00001
.99997
+1.00005

ADDITION OF DECIMALS
UNIT II

ANSWERS TO TEST

1. a. 1.587
   b. 12.14
   c. 2.3834
   d. 36.501
   e. 17.875
   f. 0.0146

2. a. 1.321
   b. 19.24
   c. 23.083
   d. 25.6791
   e. 1156.232
   f. .000149
   g. 10
   h. 0.753
   i. 9.375
   j. 1605.124
   k. 188.3006
   l. 6.4508
   m. 4.202
   n. 4.0005
   o. 0.00129
   p. 4

SUBTRACTION OF DECIMALS
UNIT III

UNIT OBJECTIVE

After completion of this unit, the student should be able to subtract decimals. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Align decimal numbers into columns for subtraction.
2. Subtract decimals.

SUBTRACTION OF DECIMALS
UNIT III

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets-
  - 1. Assignment Sheet #1--Align decimals for subtraction.
  - 2. Assignment Sheet #2--Subtract decimals.
- D. Answers to assignment sheets
- E. Test
- F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. *Basic Essentials of Math, Part I, 2nd Ed.* Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________ *Mathematics Skill Book 7700.* Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. *Applied General Mathematics.* Albany, NY 12205: Delmar Publishing Co., 1983.

SUBTRACTION OF DECIMALS
UNIT III

INFORMATION SHEET

I. Subtraction of decimals

A. Take the two numbers and align them in columnar form. Line up the decimal points and the place values.

Example: Subtract .37 from .89

$$\begin{array}{r} .89 \\ -\ .37 \\ \hline \end{array}$$

B. If one number has more digits to the right, then put in zero place holders. This will not change the number.

Examples: Subtract .3 from .5301

$$\begin{array}{r} .5301 \\ -\ .3000 \\ \hline \end{array}$$

Subtract .3847 from .5

$$\begin{array}{r} .5000 \\ -\ .3847 \\ \hline \end{array}$$

C. Starting at the extreme right, start subtracting the digits. If the bottom digit is greater than the top digit, then you will have to borrow from the next digit.

Example:

$$\begin{array}{r} .52 \\ -\ .37 \\ \hline \end{array} = \begin{array}{r} .\overset{4}{\cancel{5}}{}^{1}2 \\ -.37 \\ \hline .15 \end{array}$$

1. 7 is greater than 2, so borrow from the 5, leaving 4 and a 12.
2. 7 from 12 is 5. Write this down.
3. 3 from 4 is 1. Write this down.
4. Bring down the decimal point.

SUBTRACTION OF DECIMALS
UNIT III

ASSIGNMENT SHEET #1--ALIGN DECIMALS FOR SUBTRACTION

Directions: Align the following decimal numbers into subtraction problems. Be sure to align the decimals correctly. You do not need to subtract the numbers.

Example: 3.862 - 1.05 = $\begin{array}{r} 3.862 \\ \underline{-\ 1.05} \end{array}$

1. 45.2 - 17.8 =

2. 1.0019 - .9061 =

3. 123 - .7301 =

4. 10.506 - 9.123 =

5. 56.078 - 0 =

6. 13.09 minus 13.001 =

7. 64.2505 subtract 47.45065 =

8. 1.509 - .658 =

9. .9789 - .7626 =

10. 1.2 - .0156 =

11. 5.60051 - 4.0056 =

12. 32.58 - 16.789 =

13. 84.1 minus 37.586 =

14. 39.37 - 27.685073 =

15. 503.2 - 21 =

SUBTRACTION OF DECIMALS
UNIT III

ASSIGNMENT SHEET #2--SUBTRACT DECIMALS

Directions: Subtract the following decimals and remember to use your decimal point.

1. a. $\begin{array}{r} 5.68 \\ \underline{-4.23} \end{array}$ b. $\begin{array}{r} 7.74 \\ \underline{-2.3} \end{array}$ c. $\begin{array}{r} 6.7 \\ \underline{-.23} \end{array}$ d. $\begin{array}{r} 8 \\ \underline{-3.67} \end{array}$

2. a. $\begin{array}{r} 1.58 \\ \underline{-.408} \end{array}$ b. $\begin{array}{r} 17.005 \\ \underline{-13.9} \end{array}$ c. $\begin{array}{r} 13 \\ \underline{-.589} \end{array}$ d. $\begin{array}{r} 8.976 \\ \underline{-1.3} \end{array}$

3. a. $\begin{array}{r} 13.1 \\ \underline{-5.8078} \end{array}$ b. $\begin{array}{r} 8.7 \\ \underline{-5.1007} \end{array}$ c. $\begin{array}{r} 10.4079 \\ \underline{-7.3237} \end{array}$ d. $\begin{array}{r} 12.3004 \\ \underline{-6.5006} \end{array}$

4. a. $\begin{array}{r} 5.384 \\ \underline{-2.595} \end{array}$ b. $\begin{array}{r} 27.73 \\ \underline{-15} \end{array}$ c. $\begin{array}{r} .5 \\ \underline{-.123} \end{array}$ d. $\begin{array}{r} 12.8 \\ \underline{-7.78} \end{array}$

5. a. $\begin{array}{r} 8.299 \\ \underline{-7.3} \end{array}$ b. $\begin{array}{r} 13.1 \\ \underline{-.589} \end{array}$ c. $\begin{array}{r} 10.07 \\ \underline{-8.003} \end{array}$ d. $\begin{array}{r} 19.007 \\ \underline{-3.5} \end{array}$

6. a. $\begin{array}{r} 7.345 \\ \underline{-1.797} \end{array}$ b. $\begin{array}{r} 14.500 \\ \underline{-7.1} \end{array}$ c. $\begin{array}{r} 71.29 \\ \underline{-53.4} \end{array}$ d. $\begin{array}{r} 1.0015 \\ \underline{-.7589} \end{array}$

SUBTRACTION OF DECIMALS
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. 45.2
   -17.8

2. 1.0019
   - .9061

3. 123.0000
   - .7301

4. 10.506
   - 9.123

5. 56.078
   - 0

6. 13.09
   -13.001

7. 64.2505
   -47.45065

8. 1.509
   - .658

9. .9789
   -.7626

10. 1.2
    - .0156

11. 5.60051
    -4.0056

12. 32.58
    -16.789

13. 84.1
    -37.586

14. 39.37
    -27.685073

15. 503.2
    - 21

SUBTRACTION OF DECIMALS
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #2

1. a. 1.45 b. 5.44 c. 6.47 d. 4.33

2. a. 1.172 b. 3.105 c. 12.411 d. 7.676

3. a. 7.2922 b. 3.5993 c. 3.0842 d. 5.7998

4. a. 2.789 b. 12.73 c. .377 d. 5.02

5. a. .999 b. 12.511 c. 2.067 d. 19.507

6. a. 5.548 b. 7.4 c. 17.89 d. .2426

SUBTRACTION OF DECIMALS
UNIT III

TEST

1. Set up the following and subtract.

   a. 56.50 - 28.70 =

   b. 1.47 minus .973 =

   c. Subtract .341 from 0.78 =

   d. 0.743 subtract .4 =

   e. 5 take away .0037 =

   f. 3.00007 minus 2.990071 =

2. Subtract the following:

   a. $\begin{array}{r} 7.28 \\ \underline{-3.07} \end{array}$ b. $\begin{array}{r} .890 \\ \underline{-.538} \end{array}$ c. $\begin{array}{l} 1.838 \\ \underline{-.5} \end{array}$ d. $\begin{array}{l} 1.7 \\ \underline{-.58} \end{array}$

e. $\begin{array}{r} 1.008 \\ \underline{-.127} \end{array}$ f. $\begin{array}{r} 12.3 \\ \underline{-7.45} \end{array}$ g. $\begin{array}{r} 17.8 \\ \underline{-8.073} \end{array}$ h. $\begin{array}{r} 42 \\ \underline{-7.53} \end{array}$

i. $\begin{array}{r} 15.1 \\ \underline{-12.74} \end{array}$ j. $\begin{array}{r} 23 \\ \underline{-17.48} \end{array}$ k. $\begin{array}{r} 5.4837 \\ \underline{-3.7864} \end{array}$ l. $\begin{array}{r} 1.8660 \\ \underline{-.7071} \end{array}$

m. $\begin{array}{r} 3 \\ \underline{-.8321} \end{array}$ n. $\begin{array}{r} 25.01 \\ \underline{-23.001} \end{array}$ o. $\begin{array}{r} 1.0005 \\ \underline{-.9996} \end{array}$ p. $\begin{array}{r} .005 \\ \underline{-.0047} \end{array}$

SUBTRACTION OF DECIMALS
UNIT III

ANSWERS TO TEST

1. a. 27.8
   b. .497
   c. .439
   d. .343
   e. 4.9963
   f. .009999

2. a. 4.21 b. .352 c. 1.338 d. 1.12

   e. .881 f. 4.85 g. 9.727 h. 34.47

   i. 2.36 j. 5.52 k. 1.6973 l. 1.1589

   m. 2.1679 n. 2.0009 o. .0008 p. .0003

MULTIPLICATION OF DECIMALS
UNIT IV

UNIT OBJECTIVE

After completion of this unit, the student should be able to multiply decimals. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Set up decimals for multiplication.
2. Multiply decimals by whole numbers.
3. Multiply decimals by decimals.

MULTIPLICATION OF DECIMALS
UNIT IV

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Assignment sheets-

      1. Assignment Sheet #1--Multiply decimals by whole numbers

      2. Assignment Sheet #2--Multiply decimals by decimals

   D. Answers to assignment sheets

   E. Test

   F. Answers to test

II. References

   A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

   B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. _______________ Mathematics Skill Book 7700.
Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics.
Albany, NY 12205: Delmar Publishing Co., 1983.

MULTIPLICATION OF DECIMALS
UNIT IV

INFORMATION SHEET

I. Terms and Definitions

A. Multiplication--A fast way of adding several of the same numbers.

B. Product--The answer in a multiplication problem.

II. Multiplication

A. Write the two decimal numbers with one directly beneath the other. Put the one with fewer place values on the bottom. Line up the furthest right digits.

Example: Multiply .123 and .3.

```
 .123
 x.13
 ----
```

B. Multiply the top number by the bottom right digit. Place this partial answer directly under the bottom number.

```
Example:  .723      3 times 3 is 9.
          x.23      3 times 2 is 6.
          ----
          2169      3 times 7 is 21.
```

C. Multiply the top number by the next left bottom digit. Place this partial answer under your last partial answer, but it should be shifted one place value to the left.

```
Example:  .723
          x.23
          ----
          2169
         1446
         -----
```

D. Add these two partial answers as they are lined up.

```
Example:  .723
          x.23
          ----
          2169
         1446
         -----
         16629
```

E. Count the number of decimal places to the right of the decimal in both of the factors. Add these two together for a total of decimal places. The number of decimal places counted is how many places you must move from the right to left in order to place your decimal point.

Example:
$$\begin{array}{rl} .723 & - \ 3 \text{ places} \\ \underline{\times .23} & - \ \underline{2} \text{ places} \\ 2169 & \ \ \ \ 5 \text{ places} \\ \underline{1446} & \\ 16629 & = .16629 - 5 \text{ places} \end{array}$$

F. If you count your decimal places and you find that your answer doesn't have that many places, then you need to put zeros in front of the answer. You can then locate your decimal point.

Example:
$$\begin{array}{rl} .023 & - \ 3 \text{ places} \\ \underline{\times .01} & - \ 2 \text{ places} \\ 023 & \\ \underline{000} & \\ 0023 & \ \ \ 5 \text{ places} = .00023 \end{array}$$

MULTIPLICATION OF DECIMALS
UNIT IV

ASSIGNMENT SHEET #1--MULTIPLY DECIMALS BY WHOLE NUMBERS

Directions: Multiply the following decimals by whole numbers as you would multiply whole numbers by whole numbers. Be sure to count the number of decimal places from the right in the problem and place the decimal point in the product (answer) the number of places that you counted.

	a.	b.	c.	d.
1.	22.333 x 15	354.4 x 999	1834.005 x 1055	233.765 x 45
2.	83.45 x 20	65.4 x101	36.24 x 15	625.431 x 706
3.	153.60 x 150	68.2 x 35	18.004 x 2	168.25 x 307

MULTIPLICATION OF DECIMALS
UNIT IV

ASSIGNMENT SHEET #2--MULTIPLY DECIMALS BY DECIMALS

Directions: Multiply the following decimals as you would whole numbers. Count the decimal places from the right in both the multiplier and multiplicand, then place the decimal point in the product (answer) the number of places that you counted.

```
Examples:  3.25 - 2 places   .102 - 3 places
           x.04 - 2 places   x.58 - 2 places
          .1300 - 4 places    816   5 places
                             510
                          .05916 add zeros
                                   if needed
```

```
1.  a.  1.23      b.  .44       c.  5.1       d.  15
        x.05         x.12          x1.03         x1.001

2.  a.   78       b.  7.08      c.  6.0       d.  2.04
       x1.07         x5.01         x7.0          x1.85

3.  a.  1.008     b.  2.032     c.  .271      d.  5.007
         x165        x1.65         x.123         x2.111
```

4.	a.	14 x.00017	b.	1.33 x.003	c.	100 x.50078	d.	.43804 x.500
5.	a.	.000781 x 180	b.	1.50006 x 302	c.	5.209 x 400	d.	.2031 x.4004

MULTIPLICATION OF DECIMALS
UNIT IV

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. 334.995 b. 354045.6 c. 1934875.275 d. 10519.425

2. a. 1669 b. 6605.4 c. 543.6 d. 441554.286

3. a. 23040 b. 2387 c. 36.008 d. 51652.75

ASSIGNMENT SHEET #2

1. a. .0615 b. .0528 c. 5.253 d. 15.015

2. a. 83.46 b. 35.4708 c. 42 d. 3.774

3. a. 166.32 b. 3.3528 c. .033333 d. 10.569777

4. a. .00238 b. .00399 c. 50.078 d. .21902

5. a. .14058 b. 453.01812 c. 2083.6 d. .08132124

MULTIPLICATION OF DECIMALS
UNIT IV

TEST

Directions: Set up the following problems and multiply.

1. a. 1.6 x 1.005 =

   b. .36 times .25 =

   c. Find the product of .002 and 4.4.

   d. .506 times .202 =

   e. 0.52 multiplied by 0.34 =

   f. 1.002 times 2.45 =

2. Multiply the following:

a.	1.78	b.	.48	c.	5.04	d.	51
	x 7		x23		x103		x0.05

3.	a.	1.005	b.	2.082	c.	.6088	d.	4.125
		x.17		x1.68		x.01		x3.02
	e.	.5	f.	.886	g.	5.005	h.	.567
		x.4004		x.333		x2.1		x.004

MULTIPLICATION OF DECIMALS
UNIT IV

ANSWERS TO TEST

1. a. 1.608
   b. .09
   c. .0088
   d. .102212
   e. .1768
   f. 2.4549

2. a. 12.46
   b. 11.04
   c. 519.12
   d. 2.55

3. a. .17085
   b. 3.49776
   c. .006088
   d. 12.4575
   e. .20020
   f. .295038
   g. 10.5105
   h. .002268

DIVISION OF DECIMALS
UNIT V

UNIT OBJECTIVE

After completion of this unit, the student should be able to divide decimals. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Set up decimals for division.
2. Divide decimals by whole numbers.
3. Divide decimals by decimals.

DIVISION OF DECIMALS
UNIT V

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Assignment sheets-

      1. Assignment Sheet #1--Set up decimals for division

      2. Assignment Sheet #2--Division of decimals by whole numbers

      3. Assignment Sheet #3--Division of decimals by decimals

   D. Answers to assignment sheets

   E. Test

   F. Answers to test

II. References

   A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________ Mathematics Skill Book 7700. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Co., 1983.

DIVISION OF DECIMALS
UNIT V

INFORMATION SHEET

I. Division

A. Set up the problem with the dividend within the division frame and the divisor to the left of the division frame.

Example: .969 divided by .3,

```
        ______
   .3) .969
```

B. Before division can take place, you need to adjust the decimal point. Move the decimal point in the divisor to the right as far as it will go, then move the decimal in the dividend the same number of places to the right. Bring the decimal point directly above the division frame.

```
                  .
              ______
Example:  .03) .96.9
```

C. Estimate the number of times the divisor will divide into the first digit. If the divisor is greater than the digit, enter a zero in the division frame above the digit.

```
Example:       0   .         1.  Adjust decimal point.
             ________
          .9) 1.5.3          2.  9 is greater than 1,
                                 enter 0 above the 1.

                 3  .        1.  Adjust decimal point.
              ________
          .03) .96.9         2.  3 into 9 is 3, enter
                                 3 above the 9.
```

D. Multiply the divisor by the digit above the division frame. Place the product beneath the first digit in the dividend and subtract it.

```
Example:         3  .
              ________
          .03) .96.9
                -9
               ______
                 0
```

E. Bring down the next digit in the dividend to be with the subtracted value from Step D.

Example:

$$\begin{array}{r} 3 \\ .03\overline{)\ .96.9} \\ -9 \\ \hline 06 \end{array}$$

Bring down the six.

F. Estimate the number of times the divisor goes into this new number and place this digit above the division frame.

Example:

$$\begin{array}{r} 32. \\ .03\overline{)\ .96.9} \\ -9 \\ \hline 06 \end{array}$$

1. 3 into 6 is 2.
2. Place the 2 next to the 3 above the division frame.

G. Multiply the divisor by the two. Place this product beneath the new dividend(06). Subtract these two numbers and bring down the next digit in the original dividend.

Example:

$$\begin{array}{r} 32. \\ 03\overline{)\ 96.9} \\ -9 \\ \hline 06 \\ -6 \\ \hline 09 \end{array}$$

H. Estimate the number of times the divisor will go into this new dividend. Place the estimate next to the digits above the division frame.

DIVISION OF DECIMALS
UNIT V

ASSIGNMENT SHEET #1--SET UP DECIMALS FOR DIVISION

Directions: Set up the following decimal problems and show the required decimal movement.

a. 2.86 divided by .2

b. Divide .3629 by .86

c. 3.4506 divided by 2.02

d. .0036 divided by .003

e. 8643.2 divided by 2

f. 8.202 divided by .032

DIVISION OF DECIMALS
UNIT V

ASSIGNMENT SHEET #2--DIVISION OF DECIMALS BY WHOLE NUMBERS

Directions: Divide the following problems. Be sure to record the decimal point in your answer.

1. a. $3\overline{)\,39.6}$ b. $25\overline{)\,180.5}$ c. $2\overline{)\,.236}$

2. a. $15\overline{)\,30.30}$ b. $14\overline{)\,102.48}$ c. $13\overline{)\,39.39}$

3. a. $10\overline{)\,101.010}$ b. $5\overline{)\,25.25}$ c. $29\overline{)\,87.29}$

DIVISION OF DECIMALS
UNIT V

ASSIGNMENT SHEET #3--DIVISION OF DECIMALS BY DECIMALS

Directions: Divide the following problems. Be sure to move the decimal point in both the divisor and dividend and record the decimal in the answer.

1. a. $1.5\overline{)\,30.30}$ b. $.15\overline{)\,30.30}$

2. a. $.035\overline{)\,70.7}$ b. $3.5\overline{)\,.707}$

3. a. $6.4\overline{)\,13.84}$ b. $.3\overline{)\,6.24}$

DIVISION OF DECIMALS
UNIT V

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

a. $\underbrace{.2}/\overline{2\underbrace{.8}\overset{\bullet}{}6}$

b. $.\underbrace{86}/\overline{\underbrace{.36}\overset{\bullet}{}29}$

c. $2.\underbrace{02}/\overline{3.\underbrace{45}\overset{\bullet}{}06}$

d. $.\underbrace{003}/\overline{.\underbrace{003}\overset{\bullet}{}6}$

e. $2/\overline{8643\overset{\bullet}{.}2}$

f. $.\underbrace{032}/\overline{8.\underbrace{202}\overset{\bullet}{}}$

ASSIGNMENT SHEET #2

1. a. 13.2 b. 7.22 c. .118
2. a. 2.02 b. 7.32 c. 3.03
3. a. 10.101 b. 5.05 c. 3.01

ASSIGNMENT SHEET #3

1. a. 20.2 b. 202
2. a. 2020 b. .202
3. a. 2.1625 b. 20.8

DIVISION OF DECIMALS
UNIT V

TEST

1. Align the following decimals for division and show movement of decimal point in both divisor and dividend and the answer.

   a. 4.411 divided by .22

   b. Divide .26 by .58

   c. 6.0996 divided by .39

   d. .07 divided into 1.0066

   e. 6.488 divided by .08

   f. 2.2 divided by .03

2. Divide the following decimals by whole numbers:

   a. $3\overline{)9.561}$ b. $7\overline{)102.4849}$ c. $13\overline{).170}$

3. Divide the following decimals by decimals:

a. $3.9\overline{)\,1.73}$ b. $1.006\overline{)\,.170}$ c. $.25\overline{)\,5.0273}$

d. $.17\overline{)\,50.53}$ e. $8.6\overline{)\,273.0}$ f. $.43\overline{)\,.11051}$

DIVISION OF DECIMALS
UNIT V

ANSWERS TO TEST

1. a. $\underbrace{.22}/\overline{4\underbrace{.41}^{\bullet}1}$

   b. $\underbrace{.58}/\overline{\underbrace{.26}^{\bullet}\quad}$

   c. $\underbrace{.39}/\overline{6\underbrace{.09}^{\bullet}96}$

   d. $\underbrace{.07}/\overline{1\underbrace{.00}^{\bullet}66}$

   e. $\underbrace{.08}/\overline{6\underbrace{.48}^{\bullet}8}$

   f. $\underbrace{.03}/\overline{2\underbrace{.20}^{\bullet}\quad}$

2. a. 3.187 b. 14.6407 c. .0130769

3. a. .4435897 b. .1689861 c. 20.1092

   d. 297.23529 e. 31.744186 f. .257

MIXED COMPUTATION OF DECIMALS
UNIT VI

UNIT OBJECTIVE

After completion of this unit, the student should be able to solve mixed computation decimal problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Align given decimal problems as indicated by the symbol or term.
2. Solve given decimal problems.

MIXED COMPUTATION OF DECIMALS
UNIT VI

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Align decimals for given operation.

    2. Assignment Sheet #2--Determine operation of decimal problems.

    3. Assignment Sheet #3--Solve mixed computations of decimals.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. *Success in Mathematics, Part I*. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. *Basic Essentials of Math, Part I, 2nd Ed.* Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________ *Mathematics Skill Book 7700*. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. *Applied General Mathematics*. Albany, NY 12205: Delmar Publishing Co., 1983.

2. Move the decimal point in the dividend the same number of places to the right.

3. Place the decimal point in the answer directly above the decimal point in the dividend.

4. Divide the numbers.

MIXED COMPUTATION OF DECIMALS
UNIT VI

INFORMATION SHEET

I. Addition

A. Write the numbers in columns with the decimal points in a straight line.

B. Add the numbers.

C. Place the decimal point in the answer directly below the decimal points in the addends.

II. Subtraction

A. Write the number in columns with the decimal points in a straight line.

B. Subtract the numbers.

C. Place the decimal point in the answer directly below the decimal points in the problem.

III. Multiplication

A. Multiply the numbers.

B. Count the number of digits to the right of the decimal point in each of the factors.

C. Beginning at the right of the product, count off the total number of places determined in Step B and put the decimal point to the left of the last number counted.

IV. Division

A. Whole number divisor

1. Place the decimal point in the answer directly above the decimal point in the dividend.

2. Divide the numbers.

B. Decimal fraction divisor

1. Move the decimal point in the divisor to make a whole number.

MIXED COMPUTATION OF DECIMALS
UNIT VI

ASSIGNMENT SHEET #1--ALIGN DECIMALS FOR GIVEN OPERATION

Directions: Align the following decimals as indicated by the given symbol or term. Do not work the problem.

1. .3 times 8.2 =

2. .325 plus 6.5 =

3. 6.283 minus .04 =

4. 2.684 ÷ 2.2 =

5. 3.16 + 2.842 + .0051 =

6. 1 - .05 =

7. 2.856 x .2 =

8. 86.2 ÷ .2 =

9. 1 + .1 + .01 + .001 =

10. Find the difference between 3.5 and .8 =

MIXED COMPUTATION OF DECIMALS
UNIT VI

ASSIGNMENT SHEET #2--DETERMINE OPERATION OF DECIMAL PROBLEMS

Directions: Write the operation (addition, subtraction, multiplication or division) indicated by the symbol or term in the blanks beside each problem. You do not need to work the problems.

Example: 3.2 times 4.4 means multiplication

a. 2.55 + 3.33 means ____________________

b. 55 plus 4.4 means ____________________

c. the sum of 2.2 and 2.4 means ____________________

d. the product of 4.4 and 4.3 means ____________________

e. find the quotient of 15 divided by 5 means __________

f. find the total of 3.77 and 3.2 means ________________

g. 13.3 take away 5.4 means ____________________

h. 33.8 x 55.2 means ____________________

MIXED COMPUTATION OF DECIMALS
UNIT VI

ASSIGNMENT SHEET #3--SOLVE MIXED COMPUTATION OF DECIMALS

Directions: In the following problems, decide what operation is indicated and solve the problem using that operation. Work carefully to decide the correct operation (addition, subtraction, multiplication or division). Show your computations and record your answers.

Example: 15 times 2.2 =

$$\begin{array}{r} 2.2 \\ \underline{\times\ 15} \\ 110 \\ \underline{22} \\ 33.0 \end{array}$$

1. a. Find the sum of 13.66 and 333.3 =

   b. Find the difference between 2.33 and 65.334 =

   c. Find the product of 3.76 and 99.6 =

   d. Find the quotient of 16.5 divided by 3 =

2. a. 76.543 - 23.225 =

   b. 3756.3 x 86.66 =

   c. 54387.67 + 24.3 =

   d. 16.22 ÷ 2 =

3. Solve the following decimal problems using the indicated operation.

a. $\begin{array}{r} 36.2 \\ +\ .05 \\ \hline \end{array}$

b. $\begin{array}{r} 36.2 \\ \times\ .05 \\ \hline \end{array}$

c. $\begin{array}{r} 36.2 \\ -\ .05 \\ \hline \end{array}$

d. $.3\overline{)\,33}$

e. $\begin{array}{r} 2.3 \\ 8 \\ +\ 28.30 \\ \hline \end{array}$

f. $\begin{array}{r} 2.2 \\ \times\ 22 \\ \hline \end{array}$

g. $\begin{array}{r} 105 \\ -\ .85 \\ \hline \end{array}$

h. $2\overline{)\,20.2}$

i. $15 \div 3 =$

j. $\begin{array}{r} 15.03 \\ -\ .3 \\ \hline \end{array}$

k. $\begin{array}{r} 15.03 \\ \times\ .3 \\ \hline \end{array}$

l. $\begin{array}{r} 15.3 \\ +\ .03 \\ \hline \end{array}$

MIXED COMPUTATION OF DECIMALS
UNIT VI

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET # 1

1. 8.2
   x 3

2. 6.500
   + .325

3. 6.283
   - .040

4. 2.2)2.684

5. 3.1600
   2.8420
   + .0051

6. 1.00
   - .05

7. 2.856
   x .2

8. .2) 86.2

9. 1.00
   .1
   .01
   + .001

10. 3.5
    - .8

ASSIGNMENT SHEET #2

a. addition
b. addition
c. addition
d. multiplication
e. division
f. addition
g. subtraction
h. multiplication

ASSIGNMENT SHEET #3

1. a. 346.96
   b. 63.004
   c. 374.496
   d. 5.5

2. a. 53.318
   b. 325520.958
   c. 54411.97
   d. 8.11

3. a. 36.25   b. 1.81   c. 36.15

   d. 110   e. 38.6   f. 48.4

   g. 104.15   h. 10.1   i. 5

   j. 14.73   k. 4.509   l. 15.33

MIXED COMPUTATION OF DECIMALS
UNIT VI

TEST

1. Align the problems as indicated by the sign or symbol. Do not solve the problems. Show movement of decimal point as required in divisor, dividend and in the answer.

a. 15 x .2 =

b. 6 + .2 + .05 =

c. 18 ÷ .03 =

d. 13.39 - .201 =

e. .05 x .2 =

f. 2.8 + 3 =

2. Solve the following problems as indicated by the given term or symbol.

a. $\begin{array}{r} 33.2 \\ \underline{-\ 1} \end{array}$

b. $\begin{array}{r} 18.25 \\ \underline{\times\ .5} \end{array}$

c. $\begin{array}{r} 18.25 \\ \underline{\times\ 5} \end{array}$

d. $\begin{array}{r} 18.25 \\ \underline{-\ 5.05} \end{array}$

e. $.5\overline{)\ 18.25}$

f. $\begin{array}{r} 36.25 \\ \underline{-\ 8.75} \end{array}$

g. Find the sum of 13.3, 1.406, and .054.

h. Find the difference between 13.06 and 14.57.

i. Find the quotient of 24.372 divided by .08.

j. Find the product of .023 and 4.9.

k. What is 3.01 times 4.06?

l. What is .0037 plus 1.056?

m. Find 37.1 take away 23.45.

n. Find .34 increased by .012.

o. Find 101.4 decreased by 3.6.

p. 84.7356 - 13.8947 =

MIXED COMPUTATION OF DECIMALS
UNIT VI

ANSWERS TO TEST

1. a. $$\begin{array}{r} 15 \\ \underline{\times\ .2} \end{array}$$

   b. $$\begin{array}{r} 6.00 \\ .20 \\ \underline{+\ .05} \end{array}$$

   c. $$\underset{\smile}{.03}\overline{)\ 18\dot{0}0.}$$

   d. $$\begin{array}{r} 13.390 \\ \underline{-\ .201} \end{array}$$

   e. $$\begin{array}{r} .05 \\ \underline{\times\ .2} \end{array}$$

   f. $$\begin{array}{r} 2.8 \\ \underline{+\ 3.0} \end{array}$$

2. a. 32.2 b. 9.125 c. 91.25

   d. 13.20 e. 36.5 f. 27.5

   g. 14.76

   h. 1.51

   i. 304.65

   j. 0.1127

   k. 12.2206

   l. 1.0597

   m. 13.65

   n. 0.352

   o. 97.8

   p. 70.8409

EQUIVALENT FORMS OF DECIMALS
UNIT VII

UNIT OBJECTIVE

After completion of this unit, the student should be able to determine equivalent forms for decimals. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Change simple fractions to decimals.
2. Change mixed numbers to decimals.
3. Change decimals to simple fractions.
4. Change whole numbers and decimals to mixed fractions.
5. Read a decimal equivalent table.

EQUIVALENT FORMS OF DECIMALS
UNIT VII

SUGGESTED ACTIVITIES

I. Make transparency.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate decimal equivalent table with transparency master.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Transparency master--decimal equivalent table

   D. Assignment sheets-

      1. Assignment Sheet #1--Change fractions into decimals.

      2. Assignment Sheet #2--Change mixed numbers into decimals.

      3. Assignment Sheet #3--Change decimals into simple fractions.

      4. Assignment Sheet #4--Change whole numbers and decimals into mixed fractions.

5. Assignment Sheet #5--Use the decimal equivalent table.

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References

A. Glenn, Euel D. and David H. Wiltsie. Success in Mathematics, Part I. Bishop, CA 93514: Motivation Development, Inc., 1981.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. ______________ Mathematics Skill Book 7700. Austin, TX 78768: Steck-Vaughn Co., 1977.

D. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Co., 1983.

EQUIVALENT FORMS OF DECIMALS
UNIT VII

INFORMATION SHEET

I. Change fractions into decimals

A. Take the fraction and divide the denominator into the numerator. This will give you a decimal.

Example: $\frac{3}{4} = \begin{array}{r} 0.75 \\ 4\overline{)\,3.00} \\ \underline{-2.8} \\ 20 \\ \underline{-20} \\ 0 \end{array}$ $\quad \frac{23}{16} = \begin{array}{r} 1.4375 \\ 16\overline{)\,23.000} \\ \underline{-16} \\ 70 \\ \underline{-64} \\ 60 \\ \underline{-48} \\ 120 \\ \underline{-112} \\ 80 \end{array}$

B. Given a mixed number, take the fractional part and change to a decimal(as stated above). Add the fraction to the whole number part.

Example: $5\,\frac{1}{2} = 5 + \frac{1}{2}$; $\frac{1}{2} = .5$, so that $5 + .5$

$= 5.5$.

$4\,\frac{3}{8}$; $\frac{3}{8} = .375$, so that $4\,\frac{3}{8} = 4.375$.

(NOTE: Some fractions will need to be rounded off. Round off to the stated place value.)

II. Change decimals into fractions or mixed numbers

A. Determine the place value of the decimal(tenth, hundredth, etc.). Place the decimal number in the numerator and drop the decimal point. In the denominator place the place value. Drop any place holder zeros.

Example: .7(tenth) gives $\frac{7}{10}$

.038(thousandths) gives $\frac{38}{1000}$

B. With a decimal that is greater than 1, follow this procedure: With just the decimal part, change it into a fraction and combine with the whole number part.

Example: 3.45; .45 gives $\frac{45}{100} = \frac{9}{20}$; $3\ \frac{9}{20}$

15.05; .05 gives $\frac{5}{100} = \frac{1}{20}$; $15\ \frac{1}{20}$

(NOTE: When changing the decimal part into a fraction, always reduce the fraction to lowest terms.)

III. Decimal equivalent table--A table that shows the decimal equivalents of fractions going from 1/64 to 64/64 in multiples of 1/64's.

A. See next page for decimal equivalent table.

B. The table is divided into columns. The left has fractions and the right column has decimal numbers. The decimal number is in line with the fraction next to it. These are equal in value. So given a fractional value you can find its equivalent decimal value by looking in the left column and finding the given fraction and looking to the value at the right.

C. Given a decimal number you can look this number up in the right column and find its equivalent fractional form.

D. If you had a decimal number that were not on the table, then you would round it off to the nearest decimal and use that fractional value.

Example: $.33 = .328125 = \frac{21}{64}$

$= .34375 = \frac{11}{32}$

1. .33 is between the two values given.
2. .33 is closer to .328125.
3. So, .33 is about equal to $\frac{21}{64}$.

A. Decimal Equivalent Table

DECIMAL EQUIVALENT TABLE

1/64	0.015 625	33/64	0.515 625
1/32	0.031 25	17/32	0.531 25
3/64	0.046 875	35/64	0.546 875
1/16	0.062 5	9/16	0.562 5
5/64	0.078 125	37/64	0.578 125
3/32	0.093 75	19/32	0.593 75
7/64	0.109 375	39/64	0.609 375
1/8	0.125	5/8	0.625
9/64	0.140 625	41/64	0.640 625
5/32	0.156 25	21/32	0.656 25
11/64	0.171 875	43/64	0.671 875
3/16	0.187 5	11/16	0.687 5
13/64	0.203 125	45/64	0.703 125
7/32	0.218 75	23/32	0.718 75
15/64	0.234 375	47/64	0.734 375
1/4	0.25	3/4	0.75
17/64	0.265 625	49/64	0.765 625
9/32	0.281 25	25/32	0.781 25
19/64	0.296 875	51/64	0.796 875
5/16	0.312 5	13/16	0.812 5
21/64	0.328 125	53/64	0.828 125
11/32	0.343 75	27/32	0.843 75
23/64	0.359 375	55/64	0.859 375
3/8	0.375	7/8	0.875
25/64	0.390 625	57/64	0.890 625
13/32	0.406 25	29/32	0.906 25
27/64	0.421 875	59/64	0.921 875
7/16	0.437 5	15/16	0.937 5
29/64	0.453 125	61/64	0.953 125
15/32	0.468 75	31/32	0.968 75
31/64	0.484 375	63/64	0.984 375
1/2	0.5	1	1.

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ASSIGNMENT SHEET #1--CHANGE FRACTIONS INTO DECIMALS

Directions: In the following problems divide the denominator into the numerator and express as a decimal. Round off to nearest ten-thousandth.

1. a. $\frac{1}{4}$ = b. $\frac{1}{2}$ = c. $\frac{3}{8}$ = d. $\frac{5}{16}$ =

2. a. $\frac{13}{32}$ = b. $\frac{55}{64}$ = c. $\frac{5}{12}$ = d. $\frac{5}{20}$ =

3. a. $\frac{13}{2}$ = b. $\frac{24}{5}$ = c. $\frac{4}{15}$ = d. $\frac{13}{16}$ =

4. a. $\frac{23}{25}$ = b. $\frac{17}{20}$ = c. $\frac{43}{16}$ = d. $\frac{34}{80}$ =

5. a. $\frac{18}{8}$ = b. $\frac{513}{1000}$ = c. $\frac{6520}{2000}$ = d. $\frac{1200}{1600}$ =

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ASSIGNMENT SHEET #2--CHANGE MIXED FRACTIONS INTO DECIMALS

Directions: Change the fractional part of each mixed number into a decimal and then write it with the whole number part.

1. a. $3\frac{1}{4} =$ b. $9\frac{1}{8} =$ c. $7\frac{4}{10} =$ d. $1\frac{1}{16} =$

2. a. $6\frac{1}{10} =$ b. $8\frac{7}{16} =$ c. $2\frac{7}{8} =$ d. $11\frac{13}{64} =$

3. a. $7\frac{16}{25} =$ b. $12\frac{21}{40} =$ c. $13\frac{13}{100} =$ d. $15\frac{124}{1000} =$

4. a. $1\frac{560}{1000} =$ b. $2\frac{632}{10000} =$

c. $43\frac{2}{1000} =$ d. $48\frac{7}{10000} =$

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ASSIGNMENT SHEET #3--CHANGE DECIMALS INTO SIMPLE FRACTIONS

Directions: Determine the size of the decimals (tenths, hundredths, thousandths, etc.). Place the decimal in the numerator, drop the decimal point, place the size of the fraction in the denominator. You should have a fraction which can be reduced to lowest terms.

Example: .52 gives $\frac{52}{100} = \frac{13}{25}$

.348 gives $\frac{348}{1000} = \frac{87}{250}$

1. a. .3 = b. .7 = c. .12 =

2. a. .02 = b. .36 = c. .84 =

3. a. .145 = b. .455 = c. .976 =

4. a. .1002 = b. .4584 = c. .5888 =

5. a. .0016 = b. .01025 = c. .00625 =

6. a. .000025 = b. .20025 = c. .75075 =

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ASSIGNMENT SHEET #4--CHANGE WHOLE NUMBERS AND DECIMALS INTO MIXED FRACTIONS

Directions: Change the decimal part of the number into a fraction, then add that fraction to the whole number to form a mixed number.

Example: $5.25; .25 = \frac{25}{100} = \frac{1}{4}$ so that $5.25 = 5\ \frac{1}{4}$

$5.39; .39 = \frac{39}{100}$ so that $6.39 = 6\ \frac{39}{100}$

1. a. 5.4 = b. 6.3 = c. 7.25 =

2. a. 8.50 = b. 10.24 = c. 13.01 =

3. a. 1.401 = b. 15.378 = c. 17.512 =

4. a. 13.0625 = b. 8.56 = c. 1.056 =

5. a. 2.3305 = b. 4.0025 = c. 8.00050 =

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ASSIGNMENT SHEET #5--USE THE DECIMAL EQUIVALENT TABLE

Directions: In the following situations, refer to the decimal equivalent table to determine what size is needed. Use the nearest fraction if changing from the decimal to the fraction.

Example: $\frac{1}{4} = .25$ $.063 = \frac{1}{16}$

1. a. $\frac{3}{8} =$ b. $\frac{1}{2} =$ c. $\frac{7}{16} =$ d. $\frac{3}{16} =$

e. $\frac{63}{64} =$ f. $\frac{27}{32} =$ g. $\frac{5}{32} =$ h. $\frac{1}{16} =$

i. .626 = j. .766 = k. .969 = l. .172

m. .333 = n. .667 = o. .8 = p. .15 =

2. a. A welder reaches for a $\frac{3}{8}$ inch tip. What would be the decimal stamped on it?

   b. A machine operation calls for a .364 inch ream. What would be the nearest $\frac{1}{64}$ size ream?

   c. A mechanic measures a worn bolt to be .431. What size bolt would it be?

   d. An automotive mechanic gauges a spark gap at .031. What is the equivalent fraction from the tables?

   e. A carpenter measures a board at 7 $\frac{7}{32}$". What is its decimal equivalent length?

   f. A plastic sheet measures 64 mils or .064 inches. What is the fractional equivalent?

   g. A student measures an object to be 3 $\frac{53}{64}$" wide. What would its width be expressed as a decimal? Round off to nearest thousandth.

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. .25
   b. .50
   c. .375
   d. .3125
2. a. 0.4063
   b. 0.8594
   c. 0.4167
   d. 0.25
3. a. 6.5
   b. 4.8
   c. 0.2667
   d. 0.8125
4. a. .92
   b. .85
   c. 2.6875
   d. .425
5. a. 2.25
   b. .513
   c. 3.26
   d. .75

ASSIGNMENT SHEET #2

1. a. 3.25
   b. 9.125
   c. 7.4
   d. 1.0625
2. a. 6.1
   b. 8.4375
   c. 2.875
   d. 11.2031
3. a. 7.64
   b. 12.525
   c. 13.13
   d. 15.124
4. a. 1.560
   b. 2.0632
   c. 43.002
   d. 48.0007

ASSIGNMENT SHEET #3

1. a. $\frac{3}{10}$
   b. $\frac{7}{10}$
   c. $\frac{3}{25}$
2. a. $\frac{1}{50}$
   b. $\frac{9}{25}$
   c. $\frac{21}{25}$
3. a. $\frac{29}{200}$
   b. $\frac{91}{200}$
   c. $\frac{122}{125}$
4. a. $\frac{501}{5000}$
   b. $\frac{573}{1250}$
   c. $\frac{368}{625}$
5. a. $\frac{1}{625}$
   b. $\frac{41}{4000}$
   c. $\frac{1}{160}$
6. a. $\frac{1}{40000}$
   b. $\frac{801}{4000}$
   c. $\frac{3003}{4000}$

ASSIGNMENT SHEET #4

1. a. $5\frac{2}{5}$
   b. $6\frac{3}{10}$
   c. $7\frac{1}{4}$

2. a. $8\frac{1}{2}$
   b. $10\frac{6}{25}$
   c. $13\frac{1}{100}$

3. a. $1\frac{401}{1000}$
   b. $15\frac{189}{500}$
   c. $17\frac{64}{125}$

4. a. $13\frac{1}{16}$
   b. $8\frac{14}{25}$
   c. $1\frac{7}{125}$

5. a. $2\frac{661}{2000}$
   b. $4\frac{1}{400}$
   c. $8\frac{1}{2000}$

ASSIGNMENT SHEET #5

1. a. .375
   b. .5
   c. .4375
   d. .1875
   e. .984375
   f. .84375
   g. .15625
   h. .0625
   i. 5/8
   j. 49/64
   k. 31/32
   l. 11/64
   m. 21/64
   n. 43/64
   o. 51/64
   p. 5/32

2. a. .375
   b. 23/64
   c. 7/16
   d. 1/32
   e. 7.21875
   f. 1/16
   g. 3.828125

EQUIVALENT FORMS OF DECIMALS
UNIT VII

TEST

Directions: Fill in the missing values. Round decimals to ten-thousandths.

		DECIMAL	FRACTION			DECIMAL	FRACTION
1.	a.	_____	$\frac{3}{4}$	2.	a.	_____	$4\frac{15}{64}$
	b.	_____	$\frac{2}{5}$		b.	_____	$5\frac{5}{12}$
	c.	_____	$\frac{15}{4}$		c.	_____	$1\frac{7}{8}$
	d.	_____	$\frac{15}{16}$		d.	_____	$3\frac{2}{3}$

3. a. .5 ________ 4. a. 5.3 ________

b. .4375 ______ b. 5.025 _______

c. .565 _______ c. 5.75 _______

d. .519 _______ d. 3.375 _______

5. Using the decimal equivalent table find the following values or the nearest possible values:

a. $\frac{23}{64} =$ ____________ d. $5\frac{13}{64} =$ _____________

b. .53125 = _________ e. 3.609375 = _________

c. .56 = ___________ f. $1\frac{59}{64} =$ _____________

EQUIVALENT FORMS OF DECIMALS
UNIT VII

ANSWERS TO TEST

1. a. .75
   b. .4
   c. 3.75
   d. .9375

2. a. 4.234375 = 4.2344
   b. 5.416666 = 5.4167
   c. 1.875
   d. 3.666666 = 3.6667

3. a. $\frac{1}{2}$
   b. $\frac{7}{16}$
   c. $\frac{113}{200}$
   d. $\frac{519}{1000}$

4. a. $5\ \frac{3}{10}$
   b. $5\ \frac{1}{40}$
   c. $5\ \frac{3}{4}$
   d. $3\ \frac{3}{8}$

5. a. .359375
   b. $\frac{17}{32}$
   c. $\frac{9}{16}$
   d. 5.203125
   e. $3\ \frac{39}{64}$
   f. 1.921875

DECIMAL WORD PROBLEMS
UNIT VIII

UNIT OBJECTIVE

After completion of this unit, the student should be able to solve decimal word problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Define terms used to indicate operation.
2. Translate decimal word problems into decimal number problems.
3. Solve decimal word problems.

DECIMAL WORD PROBLEMS
UNIT VIII

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets-
  - 1. Assignment Sheet #1--Defining terms.
  - 2. Assignment Sheet #2--Translating word problems into decimal number problems.
  - 3. Assignment Sheet #3--Solve decimal word problems.
- D. Answers to assignment sheets
- E. Test
- F. Answers to test

II. References

A. Lawling, Betty S. Solving Mathematical Word Problems. Albany, NY 12205: Delmar Publishing Co., 1983.

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B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Co., 1983.

DECIMAL WORD PROBLEMS
UNIT VIII

INFORMATION SHEET

I. Operations and Terms

   A. Addition--Indicated by terms such as add, sum, and, increase, plus, more than, and by the symbol +.

   B. Subtraction--Indicated by terms such as less, minus, decrease, and by the symbol -.

   C. Multiplication--Indicated by terms such as of, product, times, and by the symbols x, ·, ()().

   D. Divide--Indicated by terms such as quotient, divided by, and by the symbol ÷.

   E. Equals--Indicated by terms such as is, are, and by the symbol =.

II. Solve Word Problems

   A. Read the problem.

   B. Label the information given in the problem.

   C. Determine the question.

   D. Estimate the answer.

   E. Decide on the procedures necessary to solve the problem.

   F. Write and solve the numerical problem.

DECIMAL WORD PROBLEMS
UNIT VIII

ASSIGNMENT SHEET #1--DEFINING TERMS

Directions: In the space next to each term write a brief description of how it relates to math problems.

a. Add-

b. Sum-

c. Solve-

d. Subtract-

e. Minus-

f. Product-

g. Times-

h. Increase-

i. Decrease-

j. Total-

k. Divide-

l. Reduce-

m. Quotient-

n. Multiply

o. Plus-

DECIMAL WORD PROBLEMS
UNIT VIII

ASSIGNMENT SHEET #2--TRANSLATING WORD PROBLEMS INTO DECIMAL NUMBER PROBLEMS

Directions: Indicate the operation(+, -, x or ÷) which is needed to solve these problems. Put your answer in the blank before each problem. (Do not solve these problems.)

1. _____ Mary bought three loaves of bread at three loaves for $1.02. What was the price of each loaf?

2. _____ Jose had his car repaired and the bill totaled $59.88. He gave the mechanic $60. How much change did he get back?

3. _____ If strawberries are 60¢ per quart, how much will 5 quarts cost?

4. _____ What will be the total cost for 5 auto parts which have these prices: 50¢, $1.25, $33.65, $18.05, 25¢?

5. _____ If a suit which originally sold for $165.00 was marked down $13.50, how much would the sale price be?

DECIMAL WORD PROBLEMS
UNIT VIII

ASSIGNMENT SHEET #3--SOLVE DECIMAL WORD PROBLEMS

Directions: Solve the following decimal word problems.

1. If Jason's car gets 13.5 miles per gallon, how many gallons of gas will he need to travel 1350 miles?

2. John bought 4.5 yards of lumber at $2.30 per yard. How much change did he get from $20?

3. A shirt originally cost $25. Robert paid $21.50 for the shirt on sale. How much did he save by buying the shirt on sale?

4. If Jane bought the following items in the office supply house, how much was her total bill?
    15 note pads at 30¢ ea.
    12 pencils at 5¢ ea.
    2 typewriter ribbons at $1.55 ea.

5. How much will Nancy earn in three months if she works 40 hours per week at $3.55 per hour? Use 1 month = 4 weeks

DECIMAL WORD PROBLEMS
UNIT VIII

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

Answers should be similar to the following and indicate these operations:

a. addition
b. addition
c. find the answer
d. subtraction
e. subtraction
f. multiplication
g. multiplication
h. addition
i. subtraction
j. addition
k. division
l. subtraction
m. division
n. multiplication
o. addition

ASSIGNMENT SHEET #2

1. ÷
2. -
3. x
4. +
5. -

ASSIGNMENT SHEET #3

1. 100 gallons
2. $9.65
3. $3.50
4. $8.20
5. $1704

DECIMAL WORD PROBLEMS
UNIT VIII

TEST

1. Define the operation indicated by the following terms or symbols. Put your answer in the blank beside each word or symbol.

   a. Product__________________________

   b. Difference_______________________

   c. Total____________________________

   d. Quotient_________________________

   e. Times____________________________

   f. Sum______________________________

   g. x________________________________

   h. ÷________________________________

   i. -________________________________

   j. +________________________________

   k. Minus____________________________

   l. Plus_____________________________

2. Set up the following word problems and indicate what operation is needed to solve the problem:

   a. Mrs. Smith sells eggs for 75¢ per dozen. If her six hens produced a total of 36 eggs in one week, how much did she receive when she sold them at the end of the week?

   b. When the Browns left home for their vacation, the odometer of their car read 12982.9 miles. When they returned 2 weeks later, the odometer read 14501.8 miles. What was the total distance they had traveled?

   c. Janice bought .75 lbs. of cheese at $2 per pound and one loaf of bread for 56¢. What was the total cost for the food?

   d. If corn is priced at 5 ears for $1, how much will 1 ear of corn cost?

   e. George wants to cut a wire that is 9.75 yards long into 3 equal pieces. What will be the length of each piece?

3. Solve the word problems in item 2(above) and record the answers below.

   a. __________ c. ______________ e. ______________

   b. __________ d. ______________

DECIMAL WORD PROBLEMS
UNIT VIII

ANSWERS TO TEST

1. a. multiplication
   b. subtraction
   c. addition
   d. division
   e. multiplication
   f. addition
   g. multiplication
   h. division
   i. subtraction
   j. addition
   k. subtraction
   l. addition

2. a. $12\overline{)\ 36}$ = .75
   # of dozens x number of dozens

   b. 14501.8
   $\underline{-12982.9}$

   c. .75 lbs.
   $\underline{x\ 2}$
   price of cheese

   price of cheese
   $\underline{+\ .56}$
   total cost

   d. $5\overline{)\ 1.00}$

   e. $3\overline{)\ 9.75}$

3. a. $2.25
   b. 1518.90
   c. $2.06
   d. 20¢
   e. 3.25 yds.

PERCENTAGE NOTATION
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to interpret percentage notation. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Identify a percent as an equivalent to a fraction with 100 as the denominator.
2. Identify the percent symbol(%) by writing in words a given percent.

PERCENTAGE NOTATION
UNIT I

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Meaning of percents

    2. Assignment Sheet #2--Identify the percentage notation

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Lawling, Betty S. Solving Mathematical Word Problems. Albany, NY 12205: Delmar Publishers Inc., 1983.

B. Shea, James T. Basic Essentials of Math, Part II, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. Smith, Robert D. Applied General Mathematics.
Albany, NY 12205: Delmar Publishers Inc., 1983.

PERCENTAGE NOTATION
UNIT I

INFORMATION SHEET

I. Terms and Definitions

A. Equivalent Fractions--Fractions expressed in different terms, yet equal in value.

Example: $\frac{2}{4} = \frac{50}{100} = \frac{1}{2}$

B. Percentage--means, from Latin, a hundred; percent, therefore, means that a quantity has been divided into a hundred parts.

C. %--The percent symbol.

II. Change a fraction to an equivalent fraction

A. To change a proper fraction to an equivalent fraction with 100 as the denominator, you divide the denominator of your fraction into 100.

B. Take the number resulting from step A and create a fraction with the number in the numerator and denominator. This has a value of 1.

C. Now multiply the fraction by this new fraction to obtain a fraction with 100 as the denominator.

Example: $\frac{4}{5} = \frac{?}{100}$ $\quad \begin{array}{r} 20 \\ 5\overline{)\,100} \end{array}$ $\quad \frac{4}{5} \times \frac{20}{20} = \frac{4\times 20}{6\times 20} = \frac{80}{100}$

(NOTE: If the original fraction is a mixed number, change it to an improper fraction first, then go through the above steps.)

III. To read a percentage

A. Read the numeral part as you would any other numeral. Read the % symbol as percent.

Example: 25% - twenty-five percent

PERCENTAGE NOTATION
UNIT I

ASSIGNMENT SHEET #1--MEANING OF PERCENTS

Directions: Change the following to an equivalent fraction with 100 as the denominator.

Example: $\frac{3}{10} = \frac{?}{100}$ $\qquad \frac{3}{10} \times \frac{10}{10} = \frac{30}{100}$

$\frac{3}{4} = \frac{?}{100}$ $\qquad \frac{3}{4} \times \frac{25}{25} = \frac{75}{100}$

1. a. $\frac{1}{10} = \frac{\quad}{100}$

b. $\frac{7}{10} = \frac{\quad}{100}$

c. $\frac{17}{25} = \frac{\quad}{100}$

d. $\frac{1}{25} = \frac{\quad}{100}$

e. $\frac{400}{1000} = \frac{\quad}{100}$

f. $\frac{124}{1000} = \frac{\quad}{100}$

g. $\frac{3}{8} = \frac{\quad}{100}$

2. a. $\frac{2}{5} = \frac{\quad}{100}$

b. $\frac{13}{20} = \frac{\quad}{100}$

c. $\frac{37}{50} = \frac{\quad}{100}$

d. $\frac{21}{50} = \frac{\quad}{100}$

e. $\frac{590}{1000} = \frac{\quad}{100}$

f. $\frac{625}{2500} = \frac{\quad}{100}$

g. $\frac{7}{16} = \frac{\quad}{100}$

PERCENTAGE NOTATION
UNIT I

ASSIGNMENT SHEET #2--IDENTIFY THE PERCENTAGE NOTATION

Directions: In the following exercise, describe in words the given percentage.

Example: 35% - thirty-five percent

1. 50% 1. ______________________________

2. 33% 2. ______________________________

3. 100% 3. ______________________________

4. 0% 4. ______________________________

5. 22 $\frac{1}{2}$% 5. ______________________________

6. 30 $\frac{3}{8}$% 6. ______________________________

7. 45 $\frac{5}{6}$% 7. ______________________________

8. 35.8% 8. ______________________________

9. 300% 9. ______________________________

10. 125% 10. ______________________________

11. 75.3% 11. ______________________________

12. 89.25% 12. ______________________________

13. 78.33% 13. ______________________________

14. 91.66% 14. ______________________________

15. .6% 15. ______________________________

16. .1% 16. ______________________________

17. .07% 17. ______________________________

PERCENTAGE NOTATION
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1.
    a. 10
    b. 70
    c. 68
    d. 4
    e. 40
    f. 12.4 or $12 \frac{2}{5}$
    g. 37.5 or $37 \frac{1}{2}$
2.
    a. 40
    b. 65
    c. 74
    d. 42
    e. 59
    f. 25
    g. 43.75 or $43 \frac{3}{4}$

ASSIGNMENT SHEET #2

1. fifty percent
2. thirty-three percent
3. one hundred percent
4. zero percent
5. twenty-two and one-half percent
6. thirty and three-eighths percent
7. forty-five and five-sixths percent
8. thirty-five and eight-tenths percent
9. three hundred percent
10. one hundred twenty-five percent
11. seventy-five and three-tenths percent
12. eighty-nine and one-fourth percent
13. seventy-eight and one-third percent
14. ninety-one and two-thirds percent
15. six-tenths of one percent
16. one-tenth of one percent
17. seven-hundredths of one percent

PERCENTAGE NOTATION
UNIT I

TEST

Directions: Change the following fractions to an equivalent fraction with 100 as the denominator.

1. a. $\frac{15}{25} = \frac{\quad}{100}$ f. $\frac{5}{8} = \frac{\quad}{100}$

b. $\frac{7}{10} = \frac{\quad}{100}$ g. $\frac{365}{500} = \frac{\quad}{100}$

c. $\frac{4}{5} = \frac{\quad}{100}$ h. $\frac{665}{700} = \frac{\quad}{100}$

d. $\frac{3}{4} = \frac{\quad}{100}$ i. $\frac{21}{75} = \frac{\quad}{100}$

e. $\frac{27}{50} = \frac{\quad}{100}$ j. $\frac{3}{16} = \frac{\quad}{100}$

Directions: Describe in words the following percentages.

2. a. 60%__________________________________

b. 35%__________________________________

c. 87%__________________________________

d. 23.4%________________________________

e. 41 $\frac{5}{8}$%________________________________

f. .6%__________________________________

g. $\frac{3}{4}$%__________________________________

PERCENTAGE NOTATION
UNIT I

ANSWERS TO TEST

1. a. 60
   b. 70
   c. 80
   d. 75
   e. 54
   f. 62.5 or 62 $\frac{1}{2}$
   g. 73
   h. 95
   i. 28
   j. 18.75 or 18 $\frac{3}{4}$

2. a. sixty percent
   b. thirty-five percent
   c. eighty-seven percent
   d. twenty-three and four-tenths percent
   e. forty-one and five-eighths percent
   f. six-tenths percent or six-tenths of one percent
   g. three-fourths percent or three-fourths of one percent

EQUIVALENT FORMS OF PERCENTS
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to determine equivalent forms of percents. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Change given decimals to percent.
2. Change given percents to decimals.
3. Change given fractions to percent.
4. Change given percents to fractions.
5. Change a given number to a decimal, fraction, or percent.

EQUIVALENT FORMS OF PERCENTS
UNIT II

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Change decimals to percents

    2. Assignment Sheet #2--Change percents to decimals

    3. Assignment Sheet #3--Change fractions to percents

    4. Assignment Sheet #4--Change percents to fractions

    5. Assignment Sheet #5--Interchange a number between three forms: decimal, fraction, and percents

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. Lawling, Betty S. Solving Mathematical Word Problems. Albany, NY 12205: Delmar Publishers Inc., 1983.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishers Inc., 1983.

EQUIVALENT FORMS OF PERCENTS
UNIT II

INFORMATION SHEET

I. Change Decimals into Percents

A. Given a decimal, move the decimal point two places to the right and add the percents symbol, %.

Example: .37 = .3.7.% = 37%

.0165 = .0.1.65% = 1.65%

2.02 = 2.0.2.% = 202%

II. Change Percents into Decimals

A. With the percentage, first drop the percent symbol, and then move the decimal point two places to the left.

Example: 33% = .3.3. = .33

150% = 1.5.0. = 1.5

B. If the percentage is a mixed number or a fraction, first express the fraction as a decimal. Then change the decimal percent into a decimal.

Example: $12\frac{1}{2}\% = 12.5\% = .125$

$\frac{3}{8}\% = .375\% = .00375$

III. Change Fractions to Percent

A. Given the fraction, change it into a decimal. Move the decimal point over two places to the left and add the percent symbol, %.

Example: $\frac{5}{8} = .625 = 62.5\%$

$2\frac{1}{8} = 2.125 = 212.5\%$

IV. Change Percents to Fractions

A. Express the percent as a decimal.

B. Express that decimal as a fraction over a multiple of ten.

Example: $.5 = \frac{5}{10}$ $.007 = \frac{67}{1000}$ $1.2 = \frac{12}{10}$

C. Reduce the fraction to lowest terms.

Example: $55\% = .55 = \frac{55}{100} = \frac{11}{20}$

$3.75\% = .0375 = \frac{375}{10000} = \frac{3}{80}$

EQUIVALENT FORMS OF PERCENTS
UNIT II

ASSIGNMENT SHEET #1--CHANGE DECIMALS INTO PERCENTS

Directions: To change a decimal into a percent, we need to move the decimal point two places to the right and place a percent symbol (%) behind the number. Change the following decimals to percents.

Example: .53 = .5.3.% = 53%

1. a. .33 =
   b. 1.04 =
   c. 2.66 =
   d. .21 =
   e. .08 =
   f. 1 =
   g. .125 =
   h. .009 =

2. a. .57 =
   b. 2.07 =
   c. .91 =
   d. .17 =
   e. .3 =
   f. .095 =
   g. .0125 =
   h. .005 =

3. a. 1.25 =
   b. .05 =
   c. 3.21 =
   d. .63 =
   e. .01 =
   f. .625 =
   g. .032 =
   h. .0025 =

EQUIVALENT FORMS OF PERCENTS
UNIT II

ASSIGNMENT SHEET #2--CHANGE PERCENTS TO DECIMALS

Directions: To change a percent to a decimal, one must drop the percent symbol and move the decimal point two places to the left.

Example: 25% = 25 = .25

1. a. 20% =
   b. 35% =
   c. 8% =
   d. 325% =
   e. 17.5% =
   f. 10.3% =
   g. $4\frac{1}{2}$% =

2. a. 50% =
   b. 23% =
   c. 1% =
   d. 207% =
   e. $5\frac{3}{4}$% =
   f. $7\frac{1}{3}$% =
   g. 16.35% =

3. a. 100% =
   b. 17% =
   c. 10% =
   d. 123% =
   e. $13\frac{1}{10}$% =
   f. $12\frac{1}{5}$% =
   g. 87.33% =

EQUIVALENT FORMS OF PERCENTS
UNIT II

ASSIGNMENT SHEET #3--CHANGE FRACTIONS TO PERCENTS

Directions: To change a fraction to a percent, you must first change the fraction to a decimal, then change the decimal to a percent. Express answers to the nearest tenth of a percent.

Example: $\frac{2}{5} = .4 = 40\%$

1. a. $\frac{1}{4} =$
   b. $\frac{1}{5} =$
   c. $\frac{3}{8} =$
   d. $\frac{11}{16} =$
   e. $\frac{1}{3} =$
   f. $\frac{5}{7} =$

2. a. $\frac{3}{6} =$
   b. $\frac{3}{4} =$
   c. $\frac{7}{8} =$
   d. $\frac{13}{32} =$
   e. $\frac{2}{3} =$
   f. $\frac{1}{9} =$

3. a. $\frac{3}{10} =$
   b. $\frac{9}{10} =$
   c. $\frac{5}{16} =$
   d. $\frac{29}{32} =$
   e. $\frac{11}{13} =$
   f. $\frac{5}{12} =$

EQUIVALENT FORMS OF PERCENTS
UNIT II

ASSIGNMENT SHEET #4--CHANGE PERCENTS TO FRACTIONS

Directions: The conversion of percents to fractions is a two-step process. First, change the percent to a decimal, then change the decimal to a fraction. Change the following percents to decimals and then to fractions.

Example: $35\% = .35 = \frac{35}{100} = \frac{7}{20}$

1. a. 20% =

   b. 24% =

   c. 4% =

   d. 75% =

   e. 17.5% =

   f. 47.5% =

   g. $34\frac{1}{2}\%$ =

2. a. 50% =

   b. 45% =

   c. 13% =

   d. 68% =

   e. 33.4% =

   f. 37.25% =

   g. $67\frac{1}{4}\%$ =

3. a. 70% =

   b. 64% =

   c. 39% =

   d. 1% =

   e. 22.4% =

   f. 88.75% =

   g. $70\frac{1}{10}\%$ =

EQUIVALENT FORMS OF PERCENTS
UNIT II

ASSIGNMENT SHEET #5--INTERCHANGE A NUMBER BETWEEN THE THREE FORMS: DECIMALS, FRACTIONS, AND PERCENTS

Directions: In the following problems you have been given one value. You must fill in the blanks by converting that number into the other two forms.

Example: $\frac{3}{4}$ = .75 = 75%

	FRACTION	DECIMAL	PERCENT
a.	$\frac{3}{8}$	______	______
b.	______	.625	______
c.	______	______	33%
d.	$\frac{1}{2}$	______	______
e.	______	.30	______
f.	$\frac{3}{50}$	______	______
g.	______	______	37.5%
h.	______	______	45%
i.	______	.07	______
j.	$1\frac{7}{12}$	______	______
k.	______	1.02	______
l.	______	______	325%

32-D

	FRACTION	DECIMAL	PERCENT
m.	______	.26	______
n.	$\frac{9}{25}$	______	______
o.	______	______	70%
p.	$\frac{1}{64}$	______	______

EQUIVALENT FORMS OF PERCENTS
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1.	a.	33%	2.	a.	57%	3.	a.	125%
	b.	104%		b.	207%		b.	5%
	c.	266%		c.	91%		c.	321%
	d.	21%		d.	17%		d.	63%
	e.	8%		e.	30%		e.	1%
	f.	100%		f.	9.5%		f.	62.5%
	g.	12.5%		g.	1.25%		g.	3.2%
	h.	.9%		h.	.5%		h.	.25%

ASSIGNMENT SHEET #2

1.	a.	.2	2.	a.	.5	3.	a.	1.00
	b.	.35		b.	.23		b.	.17
	c.	.08		c.	.01		c.	10
	d.	3.25		d.	2.07		d.	1.23
	e.	.175		e.	.0575		e.	.131
	f.	.103		f.	.0733		f.	.122
	g.	.045		g.	.1635		g.	.8733

ASSIGNMENT SHEET #3

1.	a.	25%	2.	a.	50%	3.	a.	30%
	b.	20%		b.	75%		b.	90%
	c.	37.5%		c.	87.5%		c.	31.25%
	d.	68.75%		d.	40.625%		d.	90.625%
	e.	33 1/3%		e.	66.67%		e.	84.62%
	f.	71.43%		f.	11.11%		f.	41.67%

ASSIGNMENT SHEET #4

1.
   - a. $\frac{1}{5}$
   - b. $\frac{6}{25}$
   - c. $\frac{1}{25}$
   - d. $\frac{3}{4}$
   - e. $\frac{7}{40}$
   - f. $\frac{19}{40}$
   - g. $\frac{69}{200}$

2.
   - a. $\frac{1}{2}$
   - b. $\frac{9}{20}$
   - c. $\frac{13}{100}$
   - d. $\frac{17}{25}$
   - e. $\frac{167}{500}$
   - f. $\frac{149}{400}$
   - g. $\frac{269}{400}$

3.
   - a. $\frac{7}{10}$
   - b. $\frac{16}{25}$
   - c. $\frac{39}{100}$
   - d. $\frac{1}{100}$
   - e. $\frac{28}{125}$
   - f. $\frac{71}{80}$
   - g. $\frac{701}{1000}$

ASSIGNMENT SHEET #5

a. .375, 37.5%

b. $\frac{5}{8}$, 62.5%

c. $\frac{33}{100}$, .33

d. .5, 50%

e. $\frac{3}{10}$, 30%

f. .06, 6%

g. $\frac{3}{8}$, .375

h. $\frac{9}{20}$, .45

i. $\frac{7}{100}$, 7%

j. 1.583, 158.3%

k. $1\frac{1}{50}$, 102%

l. $3\frac{1}{4}$, 3.25

m. $\frac{13}{50}$, 26%

n. .36, 36%

o. $\frac{7}{10}$, .7

p. .015625, 1.5625%

EQUIVALENT FORMS OF PERCENTS
UNIT II

TEST

1. Change the following decimals to percents:

a. .25 =

b. .6 =

c. .03 =

d. .87 =

e. .137 =

2. Change the following percents to decimals:

a. 78% =

b. 20% =

c. 24% =

d. 158% =

e. $\frac{3}{4}\%$ =

f. 1.7% =

g. $5\frac{1}{2}\%$ =

h. 7% =

i. 260% =

3. Change the following fractions to percents:

a. $\frac{3}{4}$ =

b. $\frac{5}{8}$ =

c. $\frac{13}{50}$ =

d. $1\frac{5}{100}$ =

e. $\frac{750}{1000}$ =

4. Change the following percents to fractions. Reduce the fractions to lowest terms.

a. 75% =

b. 160% =

c. .15% =

d. 25% =

e. 35.5% =

5. Fill in the blanks with the equivalent form as indicated:

	FRACTION	DECIMAL	PERCENT
a.	$\frac{32}{50}$	______	______
b.	______	.48	______
c.	______	______	$72\frac{1}{2}\%$
d.	$\frac{15}{60}$	______	______

EQUIVALENT FORMS OF PERCENTS
UNIT II

ANSWERS TO TEST

1. a. 25%
   b. 60%
   c. 3%
   d. 87%
   e. 13.7%

2. a. .78
   b. .2
   c. .24
   d. 1.58
   e. .0075
   f. .017
   g. .055
   h. .07
   i. 2.6

3. a. 75%
   b. 62.5%
   c. 26%
   d. 105%
   e. 75%

4. a. $\frac{3}{4}$
   b. $1\frac{3}{5}$
   c. $\frac{3}{2000}$
   d. $\frac{1}{4}$
   e. $\frac{71}{200}$

5. a. $\frac{32}{50}$, .64, 64%
   b. $\frac{12}{25}$, .48, 48%
   c. $\frac{29}{40}$, .725, $72\frac{1}{2}$%
   d. $\frac{15}{60}$, .25, 25%

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

UNIT OBJECTIVE

After completion of this unit, the student should be able to compute percentage problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Compute the percent of a quantity.
2. Find what percent one quantity is of another.
3. Find a base number when a percent of it is given.
4. Compute reduction, selling price, percent of reduction or increase.
5. Figure simple interest.
6. Compute compound interest.

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

SUGGESTED ACTIVITIES

I. Make transparency.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate percentage computation with transparency master.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Transparency master--Percent Computation Triangle
- D. Assignment sheets-
    1. Assignment Sheet #1--Compute the percent of a quantity
    2. Assignment Sheet #2--Find what percent one quantity is of another
    3. Assignment Sheet #3--Find a base number
    4. Assignment Sheet #4--Compute reduction, selling price, percent of reduction or increase

5. Assignment Sheet #5--Compute simple interest
6. Assignment Sheet #6--Compute compound interest

E. Answers to assignment sheets

F. Test

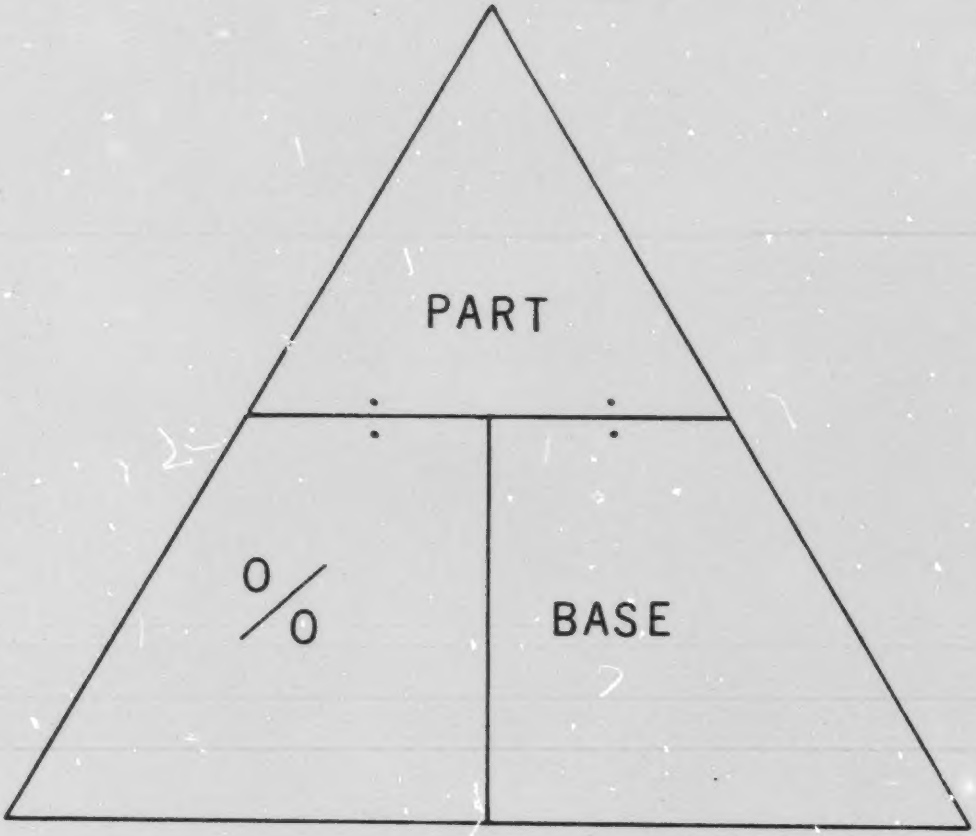
G. Answers to test

II. References

A. Lawling, Betty S. Solving Mathematical Word Problems. Albany, NY 12205: Delmar Publishers Inc., 1983.

B. Shea, James T. Basic Essentials of Math, Part I, 2nd Ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

C. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishers Inc., 1983.



Percentage Computation Triangle

TM - 1

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

INFORMATION SHEET

I. Terms and Definitions

A. Percent--Per one hundred; a quantity that has been divided into a hundred parts; a percent expressed as a fraction has 100 as the denominator; a ratio of so many out of a hundred.

Example: 5% is $\frac{5}{100}$ or a ratio of 5 out of a hundred

B. Part--The numerator of a percent ratio.

Example: The numerator 5 is called the part of the fraction.

$$5\% = .05 = \frac{5}{100}$$

(NOTE: You have seen already that a percent can be expressed as a fraction or decimal fraction.)

C. Base--The denominator of the ratio; the whole amount of a divided quantity.

Example: $5\% = .05 = \frac{5}{100}$ The denominator 100 is the base of the ratio.

D. Discount--Amount of reduction in price.

E. Rate of Discount--Percentage of reduction in price.

F. Net Price or Sale Price--The difference between the original price and the amount of discount.

G. Profit--Difference in amount of cost of goods to business and amount the goods sell for to the consumer.

H. Rate of Profit--Percentage of profit.

I. Depreciation--Loss of a part of value of goods over a period of time.

J. Interest--Money paid for the use of money.

II. Types of percentage problems

A. Finding the percent of a quantity

1. Change the percent to a decimal or fraction.
2. Multiply the number in the problem by the decimal or fraction.
3. The product of the multiplication is the percent of the original quantity.

Example: Find 38% of 15.

1. 38% = .38
2. 15 x .38 = 5.7
3. Answer is 5.7.

B. Finding what percent one quantity is of another

1. Decide which of the numbers is the base or whole quantity in your problem.
2. Decide which number is part of the base number. (NOTE: A helpful way to determine base(whole) and part is to look for the numbers indicated by the words "is" and "of". "Is" usually refers to the part and "of" to the base of whole; $\frac{\text{is}}{\text{of}} = \frac{\text{part}}{\text{base}}$.)
3. Make a fraction of the two numbers with the base as the denominator.
4. Divide the base number into the part to get a decimal number.
5. Change the decimal number into a percent. Round off to the nearest percent unless instructed to carry out answer farther.

Example: 33 is what percent of 165?

1. "of 165" indicates that the base equals 165.
2. "33 is" indicates that the part equals 33.
3. $\frac{\text{is}}{\text{of}} = \frac{33}{165}$
4. $$\begin{array}{r} .2 \\ 165\overline{)\,33.0} \\ 33\;0 \end{array}$$

5. .2 = 20% - Answer

(NOTE: This type of problem can be solved by writing the part and base as a proportion, comparing the part-base ratio to a base of 100.)

Example: 15 is what percent of 80?

$$\frac{15}{80} = \frac{?}{100}$$

1500 - 80 = 18.75%

C. Finding a number when a percent of it is given

1. Change the percent to a decimal or a fraction.
2. Divide the given number by this decimal or fraction.

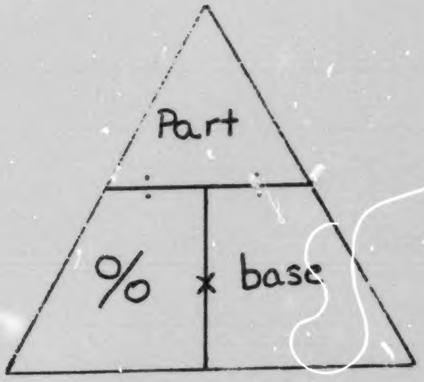
Example: 13 is 25% of what number?

1. 25% = .25
2. 52 - Answer

.25) 13.00

(NOTE: It is often difficult to remember numbers which are to be divided or multiplied in the three types of percentage problems. The following triangle can be helpful in telling the student what operation is needed and which numbers are to be computed.)

D. Percentage Computation Triangle

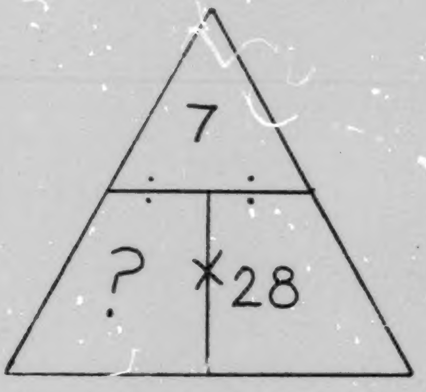


÷ means the part divided by the base or the part divided by the percent

x means the percent times the base

(NOTE: To use the triangle, identify the given quantities in the problem, put them in the position indicated by the triangle; perform the operation as indicated by the triangle to solve for the unknown quantity.)

Example: 7 is what percent of 28?



7 is the part

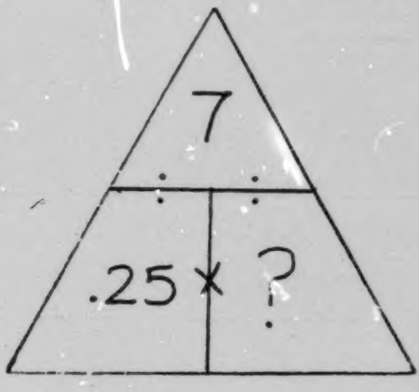
28 is the base

Percent is unknown

7 divided by 28 = .25 or 25%

(NOTE: Always change the percent to either a decimal or fraction before computing the answer.)

Example: 7 is 25% of what number?



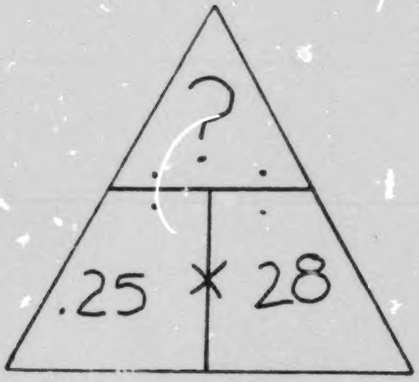
7 is the part

.25 is percent(changed to a decimal)

Base is unknown

7 divided by .25 = 28

Example: 25% of 28 is what number?



.25 is percent

28 is base

Part is unknown

.25 times 28 = 7

III. Types of Interest

A. Simple Interest--Interest earned on an amount of money at the same rate over a period of time; using the simple interest formula - I = P x r x t; where

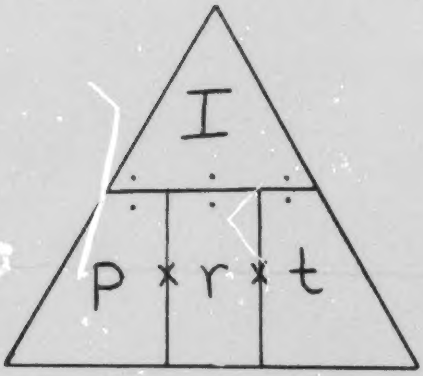
1. I = interest; amount charged for the use of money
2. p = principle; the amount borrowed or lent
3. r = rate; the percent of interest charged or earned
4. t = time; the actual calendar time for which the money is borrowed or lent
5. A = amount; the total amount to be paid; principle plus interest

Example: Compute simple interest on $1000 at 7% for 1 year.

I = P x r x t

I = 1000 x .07 x 1 = $70

(NOTE: The interest formula may be rewritten in the "triangle" form to aid in determining what operation is needed.)



B. Compound Interest--Interest earned on interest as well as principle; interest earned on principle for a period of time is added to principle; process continues for the necessary number of periods.

1. Rate of interest period--Divide the annual interest rate by the number of interest periods per year.

2. Number of interest periods--Multiply the number of interest periods per year times the number of years.

(NOTE: The interest must be computed for each interest period. The amount of interest is added to the principle at each computation.)

Example: Compute the compound interest quarterly on $1000 at 7%.

1. Compound quarterly means 4 interest periods.

2. Rate per interest period = 7% - 4 = 1 3/4% or 0.0175.

(NOTE: Because there are 4 interest periods, 4 computations must be made.)

Computation for 1st quarter:

$1000 x .0175 = $17.50 - interest

Principle	$1000	
+Interest	17.50	
	1017.50	- new principle

Computation for 2nd quarter:

$1017.50 x .0175 = $17.81 - interest

$\begin{array}{r} \$1017.50 \\ \underline{+\ 17.81} \\ \$1035.31 \end{array}$ - new principle

Computation for 3rd quarter:

$1035.31 x .0175 = $18.12 - interest

$\begin{array}{r} \$1035.31 \\ \underline{+\ 18.12} \\ \$1053.43 \end{array}$ - new principle

Computation for 4th quarter:

$1053.43 x .0175 = $18.44 - interest

$\begin{array}{r} \$1053.43 \\ \underline{+\ 18.44} \\ \$1071.87 \end{array}$ - new principle

C. Compound Interest Table

(NOTE: Computing compound interest is time-consuming. The following table can be used to determine compound interest.)

1. Determine the number of interest periods per year.
2. Find the rate of interest per period.
3. Find the total number of interest periods under the n column.
4. Follow the line across to the appropriate percent of interest per period column.
5. Multiply the number in this column by the amount of principle.
6. To find the amount of interest earned during the time, subtract the answer from the original amount of principle.

THE COMPOUND AMOUNT OF $1

n	1/2%	3/4%	1%	1 1/2%	2%	2 1/2%	3%	3 1/2%	4%	4 1/2%	5%	5 1/2%	6%	7%
1	1.0050	1.0075	1.0100	1.0150	1.0200	1.0250	1.0300	1.0350	1.0400	1.0450	1.0500	1.0550	1.0600	1.0700
2	1.0100	1.0151	1.0201	1.0302	1.0404	1.0506	1.0609	1.0712	1.0816	1.0920	1.1025	1.1130	1.1236	1.1449
3	1.0151	1.0227	1.0303	1.0457	1.0612	1.0769	1.0927	1.1087	1.1249	1.1412	1.1576	1.1742	1.1910	1.2250
4	1.0202	1.0303	1.0406	1.0614	1.0824	1.1038	1.1255	1.1475	1.1699	1.1925	1.2155	1.2388	1.2625	1.3108
5	1.0253	1.0381	1.0510	1.0773	1.1041	1.1314	1.1593	1.1877	1.2167	1.2462	1.2763	1.3070	1.3382	1.4026
6	1.0304	1.0459	1.0615	1.0934	1.1262	1.1597	1.1941	1.2293	1.2653	1.3023	1.3401	1.3788	1.4185	1.5007
7	1.0355	1.0537	1.0721	1.1098	1.1487	1.1887	1.2299	1.2723	1.3159	1.3609	1.4071	1.4547	1.5036	1.6058
8	1.0407	1.0616	1.0829	1.1265	1.1717	1.2184	1.2668	1.3168	1.3686	1.4221	1.4775	1.5347	1.5938	1.7182
9	1.0459	1.0696	1.0937	1.1434	1.1951	1.2489	1.3048	1.3629	1.4233	1.4861	1.5513	1.6191	1.6895	1.8385
10	1.0511	1.0776	1.1046	1.1605	1.2190	1.2801	1.3439	1.4106	1.4802	1.5530	1.6289	1.7081	1.7908	1.9672
11	1.0564	1.0857	1.1157	1.1779	1.2434	1.3121	1.3842	1.4600	1.5395	1.6229	1.7103	1.8021	1.8983	2.1049
12	1.0617	1.0938	1.1268	1.1956	1.2682	1.3449	1.4258	1.5111	1.6010	1.6959	1.7959	1.9012	2.0122	2.2522
13	1.0670	1.1020	1.1381	1.2136	1.2936	1.3785	1.4685	1.5640	1.6651	1.7722	1.8856	2.0058	2.1329	2.4098
14	1.0723	1.1103	1.1495	1.2318	1.3195	1.4130	1.5126	1.6187	1.7317	1.8519	1.9799	2.1161	2.2609	2.5785
15	1.0777	1.1186	1.1610	1.2502	1.3459	1.4483	1.5580	1.6753	1.8009	1.9353	2.0789	2.2325	2.3966	2.7590
16	1.0831	1.1270	1.1726	1.2690	1.3728	1.4845	1.6047	1.7340	1.8730	2.0224	2.1829	2.3553	2.5404	2.9522
17	1.0885	1.1354	1.1843	1.2880	1.4002	1.5216	1.6528	1.7947	1.9479	2.1134	2.2920	2.4848	2.6928	3.1588
18	1.0939	1.1440	1.1961	1.3073	1.4282	1.5597	1.7024	1.8575	2.0258	2.2085	2.4066	2.6215	2.8543	3.3799
19	1.0994	1.1525	1.2081	1.3270	1.4568	1.5987	1.7535	1.9225	2.1068	2.3079	2.5270	2.7656	3.0256	3.6165
20	1.1049	1.1612	1.2202	1.3469	1.4859	1.6386	1.8061	1.9898	2.1911	2.4117	2.6533	2.9178	3.2071	3.8697
21	1.1104	1.1699	1.2324	1.3671	1.5157	1.6796	1.8603	2.0594	2.2788	2.5202	2.7860	3.0782	3.3996	4.1406
22	1.1160	1.1787	1.2447	1.3876	1.5460	1.7216	1.9161	2.1315	2.3699	2.6337	2.9253	3.2475	3.6035	4.4304
23	1.1216	1.1875	1.2572	1.4084	1.5769	1.7646	1.9736	2.2061	2.4647	2.7522	3.0715	3.4262	3.8197	4.7405
24	1.1272	1.1964	1.2697	1.4295	1.6084	1.8087	2.0328	2.2833	2.5633	2.8760	3.2251	3.6146	4.0489	5.0724
25	1.1328	1.2054	1.2824	1.4509	1.6406	1.8539	2.0938	2.3632	2.6658	3.0054	3.3864	3.8134	4.2919	5.4274

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #1--COMPUTE THE PERCENT OF A QUANTITY

Directions: Set up the following problems, first as a fraction and then as a percent.

Example: 23 is what percent of 69?

$$\frac{23}{69} = 33\frac{1}{3}\%$$

1. a. 24 is what percent of 75?

   b. 84 is what percent of 240?

   c. 5 is what percent of 1000?

   d. 2.4 is what percent of 9.6?

   e. 300 cookies are made. If one student made 45 cookies, then what percent did that student make?

   f. A company sells 1200 books out of the inventory of 5000 books. What percent were sold?

   g. A company rejects 364 parts out of 2400 parts. What percent were rejected?

   h. .15 is what percent of .9?

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i. 56000 is what percent of 616000?

j. Five students out of a class of 79 scored an A. What percent got A's?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #2--FIND WHAT PERCENT ONE QUANTITY IS OF ANOTHER

Directions: Find the percentage of the following numbers.

1. a. 50% of 48

   b. 25% of 84

   c. 37% of 185

   d. 33 $\frac{1}{3}$% of 192

   e. 100% of 39

   f. 150% of 62

   g. 166 $\frac{2}{3}$% of 102

   h. 37.5% of 88

   i. .6% of 18

   j. $\frac{5}{8}$% of 600

k. $\frac{3}{4}$% of 224

l. 1.2% of 5.6

m. 39.3% of 124.8

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #3--FIND A BASE NUMBER

Directions: The part and the percentage are given. Find the base or whole in each problem.

1. a. If 39 represents 15%, then what is the total?

   b. If 1380 represents 23%, then what is the total?

   c. The part 45 is 75% of the total. What is the total?

   d. The part .325 is 65% of the total. What is the total?

   e. If 75% of the total is 27, what is the total?

   f. The part .15 is 12% of the total. What is the total?

Directions: Find the missing quantity.

2. a. If Bob completed 93% of the problems and he did 279 problems, what is the total he should have done?

   b. A salesman received $1500 as his 2% commission. How much did he sell?

c. A company passes inspection on 97% of its products. If it passed 19,400 products, then how many were made?

d. A student scores 75% on a test. If he answered 150 questions correctly, then how many were possible?

e. A homebuyer put down $8400 on a home. If it was 20% of the home's cost, then what did the home cost?

f. If 20% of a mixture is water and you added 5 cups of water, then how many cups of mixture were there?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #4--COMPUTE REDUCTION, SELLING PRICE, PERCENT OF REDUCTION OR INCREASE

Directions: Solve the following problems.

1. a. A store buys women's blouses for $35. If the store marks the blouse up 45%, what will be the selling price of the blouse?

   b. A candy store sells fudge for $1.25 per pound. It costs the store 85¢ per pound to make the fudge. What is their profit rate?

   c. A trailer that usually costs $3500 is on sale for $2800. What is the percent of discount?

   d. A fire damaged 40% of tbe lumber in a lumber yard. The lumber was originally worth $170000. What was the amount of loss to the company?

   e. If a pharmacy company makes 600% profit on an antibiotic, what will be the selling price of a unit of antibiotic that costs $1.40 to produce?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #5--COMPUTE SIMPLE INTEREST

Directions: Answer the following problems, using the formula for simple interest.

1. a. What will be the interest on a loan of $3000 borrowed from a bank for 3 years at 12%?

   b. If the interest on a loan of $10,000 is $400 for one year, what is the rate?

   c. A loan of $3100 for 90 days at 18% would cost you how much in interest?

   d. If you loaned a friend $60 for 6 months at 10% interest, how much would the friend pay you back at the end of 6 months?

   e. A company repaid a $4000 loan with $480 interest. The loan was made at 4% interest. How long was the loan in force?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ASSIGNMENT SHEET #6--COMPUTE COMPOUND INTEREST

Directions: Solve the following problems involving compound interest.

1. a. Jane has a $300 savings account which pays 5% quarterly. How much will she have in her account at the end of the first year?

   b. George has $600 in his savings account and is paid semi-annually. How much interest will he earn by the end of the second year if the 8% interest rate is compounded semi-annually?

   c. If Mitzi has a savings account of $200 for one year, and interest is compounded quarterly at 16%, how much will her account earn in interest?

   d. José inherited $3000 which he invested in bonds paying 12%, compounded semi-annually. How much interest will his investment earn by the end of the first year?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. $\frac{24}{75} = 32\%$
   b. $\frac{84}{240} = 35\%$
   c. $\frac{5}{1000} = .5\%$
   d. $\frac{2.4}{9.6} = 25\%$
   e. $\frac{45}{300} = 15\%$
   f. $\frac{1200}{5000} = 24\%$
   g. $\frac{364}{2400} = 15.17\%$
   h. $\frac{.15}{.9} = 16.67\%$
   i. $\frac{56000}{616000} = 9.09\%$
   j. $\frac{5}{79} = 6.33\%$

ASSIGNMENT SHEET #2

1. a. 24
   b. 21
   c. 68.45
   d. 64
   e. 39
   f. 93
   g. 170
   h. 33
   i. .108
   j. 3.75
   k. 1.68
   l. .0672
   m. 49.0464

ASSIGNMENT SHEET #3

1. a. 260
   b. 6000
   c. 60
   d. .5
   e. 36
   f. 1.25

2. a. 300
   b. 75000
   c. 20000
   d. 200
   e. \$42000
   f. 25

ASSIGNMENT SHEET #4

1. a. $50.75
   b. 47%
   c. 20%
   d. $68000
   e. $9.80

ASSIGNMENT SHEET #5

1. a. $1080
   b. 4%
   c. $ 139.50
   d. $63
   e. 3 years

ASSIGNMENT SHEET #6

1. a. $315.28
   b. $101.92
   c. $33.98
   d. $370.80

c. Nineteen of 160 graduates have not found a job. What percent have found jobs?

3. a. 51% of what number is 102?

b. 4 is 2.5% of what number?

c. 25% of what number is 6?

4. a. Margaret found a coat on sale for $60. It had been reduced in price 20%. What was the original price of the coat?

b. The price of a used car decreased $200 in a year. This was an 8% decrease. What was the original price of the car?

c. Jane wants to lose 20% of her present weight. She wants to weigh 130. How much does she weigh now?

5. a. What will be the simple interest on a loan of $500 at 13% for 2 years?

b. What is the rate of interest on a $1000 loan for 2 years, if the amount of simple interest is $410?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

TEST

Directions: Solve the following problems.

1. a. An office worker received an 8% raise. Her previous wage was $4.50 per hour. How much was her raise?

   b. A local vocational school has 40 employees: 15% are administrators, 5% are custodians and 80% are instructors. Find the number of employees in each occupation.

   c. The cost of buying a car increased by 4% this past year. How much more will a new car cost now if it cost $9600 last year?

2. a. The training unit of 140 men at the Army base has 84 career officers. What percent of the men in the unit are career officers?

   b. Enrollment in auto mechanics class has increased from 25 last year to 30 this year. What is the percent of increase in enrollment?

6. a. Compute the interest on a loan of $3000 for 1 year at 6% compounded semi-annually.

   b. How much would have to be paid back at the end of 1 year on a loan of $600 at 20% compounded quarterly?

PERCENTAGE PROBLEM COMPUTATIONS
UNIT III

ANSWERS TO TEST

1. a. 36¢ per hour
   b. administrators = 6
   instructors = 32
   custodians = 2
   c. $384

2. a. 60%
   b. 20%
   c. 88%

3. a. 200
   b. 160
   c. 24

4. a. $75
   b. $2500
   c. 162.5 lbs.

5. a. $130
   b. 20.5%

6. a. $182.70
   b. $729.30

MEASURES IN STANDARD SYSTEM
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to read measures in the standard system and measure in the standard system. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Define types of measures in standard system.
2. Read linear measures in the standard system.
3. Draw linear measures in the standard system.

MEASURES IN STANDARD SYSTEM
UNIT I

SUGGESTED ACTIVITIES

I. Make transparency.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate Division of a Ruler with transparency master.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Transparency master--Division of a Ruler

   D. Assignment sheets-

      1. Assignment Sheet #1--Define types of measures in standard system.

      2. Assignment Sheet #2--Read linear measures in standard system.

      3. Assignment Sheet #3--Draw linear measures in standard system.

   E. Answers to assignment sheets

   F. Test

G. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. Basic Mathematics Simplified, 4th Ed. Albany, NY 12205: Delmar Publishing Co., 1977.

B. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishing Co., 1983.

C. Wiltsie, David H. Vocational Math Series, Book 2. Bishop, CA 93514: Motivation Development, Inc., 1982.

MEASURES IN STANDARD SYSTEM
UNIT I

INFORMATION SHEET

I. Terms and Definitions

A. Measurement--Comparison of a quantity with a standard unit.

B. Denominate number--A number that refers to a special unit of measure.

Example: 5 $\frac{1}{4}$ feet

C. Compound denominate number--More than one unit of measure.

Example: 5 feet 3 inches

D. Standard system--The English system of measures, which includes units such as feet, inches, pints, quarts, pounds, ounces, etc.

II. Types of Measure

A. Linear measure--A system of measuring length.

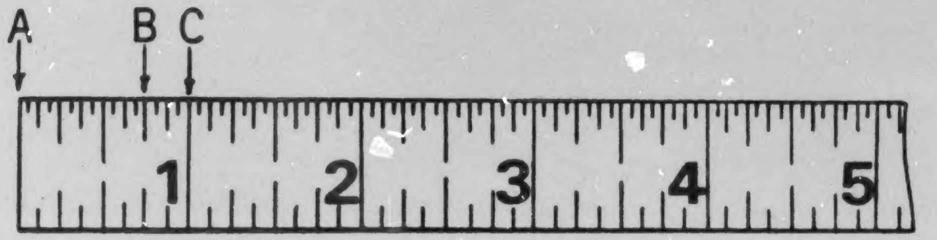
B. Liquid measure--A system of measuring liquids.

C. Dry measure--A system of measuring the volume of dry things, such as grain, vegetables, etc.

D. Weight measure--A system of measuring mass or heaviness.

E. Time measure--A system of measuring duration.

III. Reading a Ruler



A. Scale--Based upon the number of divisions in an inch.

Examples: One-eighth scale--eight divisions in each inch; one-sixteenth scale--sixteen divisions in each inch

B. Rulers read similarly

(NOTE: Some rulers have more divisions per inch than others.)

C. Procedures

1. Count divisions per inch to determine scale.

   (NOTE: The number of divisions per inch will be the denominator in expressing a fraction of an inch.)

   Example: In the ruler above, the number of divisions from A to C(one inch) is 16; therefore, each division is $\frac{1}{16}$ inch.

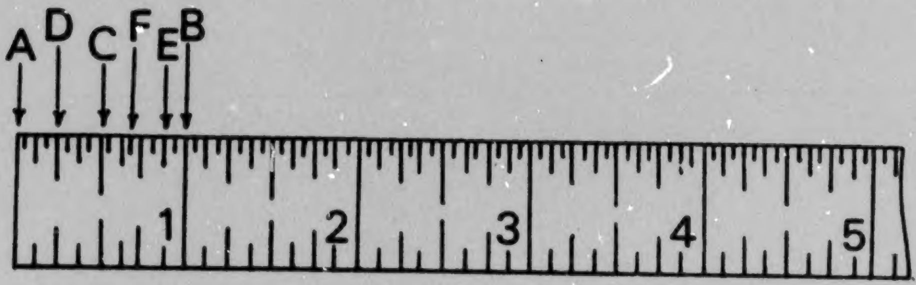
2. Count the number of divisions included in the line being measured. This becomes the numerator of the fraction.

   Example: Line $\overline{AB}$ above is 12 divisions long; therefore, the length of the line is $\frac{12}{16}$ of an inch.

3. Reduce the answer if possible.

   Example: $\frac{12}{16} = \frac{3}{4}$

DIVISIONS OF A RULER



AB = 1 INCH = $\frac{16}{16} = \frac{8}{8} = \frac{4}{4} = \frac{2}{2} = 1$

AC = $\frac{1}{2}$ INCH = $\frac{8}{16} = \frac{4}{8} = \frac{2}{4} = \frac{1}{2}$

AD = $\frac{1}{4}$ INCH = $\frac{4}{16} = \frac{2}{8} = \frac{1}{4}$

AE = $\frac{7}{8}$ INCH = $\frac{14}{16} = \frac{7}{8}$

AF = $\frac{11}{16}$ INCH

MEASURES IN STANDARD SYSTEM
UNIT I

ASSIGNMENT SHEET #1--DEFINE TYPES OF MEASURES IN STANDARD SYSTEM

Directions: Define the following terms.

a. Linear measure-

b. Liquid measure-

c. Weight measure-

d. Dry measure-

e. Time measure-

MEASURES IN STANDARD SYSTEM
UNIT I

ASSIGNMENT SHEET #2--READ LINEAR MEASURES IN STANDARD SYSTEM

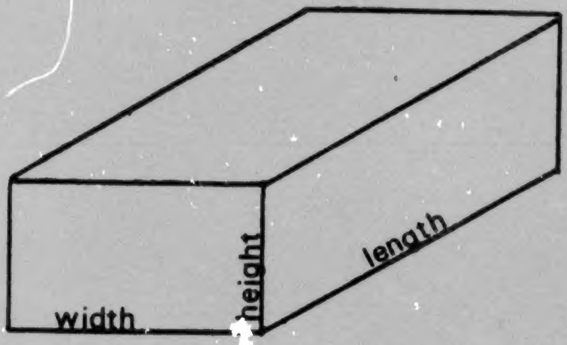
1. With the ruler provided for this lesson, measure to the nearest sixteenth of an inch the following lines.

A ________________________________ B = ______________

C ________________________ D = ______________

E _______________________________ F = ______________

G ___________________________ H = ______________



This box is:

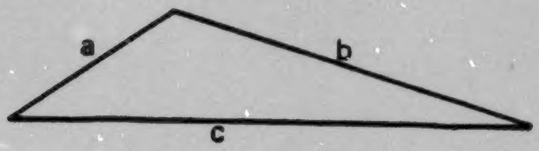
a. ______ inches long

b. ______ inches wide

c. ______ inches high

3. The length of the sides of this triangle are to be measured individually and totaled.

Measure to the nearest $\frac{1}{16}$ of an inch.



side a = ______"

side b = ______"

side c = ______"

total all three = ________"

MEASURES IN STANDARD SYSTEM
UNIT I

ASSIGNMENT SHEET #3--DRAW MEASURES IN STANDARD SYSTEM

1. Draw lines the following length(use the ruler provided)

   a. $3\frac{5}{8}''$

   b. $4\frac{7}{16}''$

   c. $2\frac{3}{4}''$

   d. $5\frac{3}{8}''$

2. Draw a rectangle with sides as follows:

   length - $2\frac{1}{8}''$

   width - $1\frac{5}{8}''$

MEASURES IN STANDARD SYSTEM
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

Answers may vary slightly, but should be similar to these.

a. a system for measuring length

b. a system for measuring liquids

c. a system for measuring mass or heaviness

d. a system for measuring dry things, such as grain, vegetables, etc.

e. a system for measuring duration

ASSIGNMENT SHEET #2

1. AB = $3\frac{7}{16}$"

   CD = $2\frac{3}{8}$"

   EF = $3\frac{3}{16}$"

   GH = $2\frac{13}{16}$"

2. a. 2" long

   b. $1\frac{1}{2}$" wide

   c. $\frac{7}{8}$" high

3. side a = $1\frac{1}{8}$"

   side b = $2\frac{3}{16}$"

   side c = $3\frac{1}{16}$"

   total = $6\frac{3}{8}$"

ASSIGNMENT SHEET #3

Instructor will measure lines and rectangle to determine accuracy of drawing.

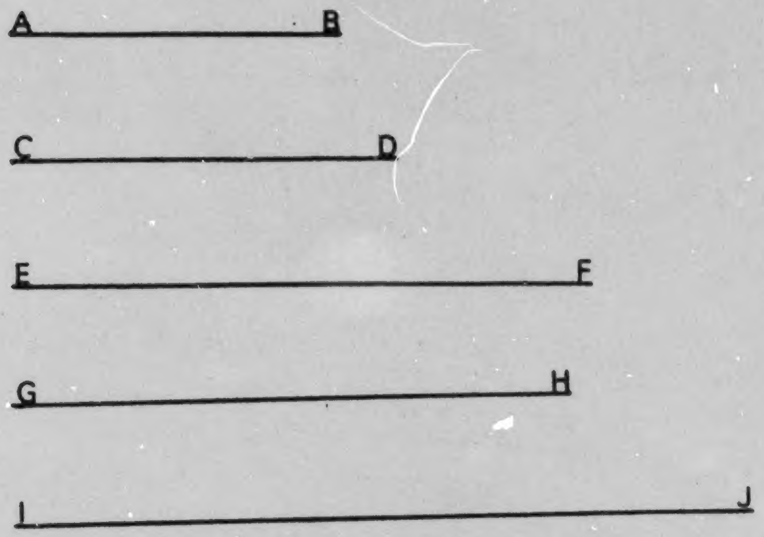
MEASURES IN STANDARD SYSTEM
UNIT I

TEST

1. Match the following terms and definitions. Put the number in the blank beside the matching letter.

a.	_____ time measure	1.	A system of measuring liquids
b.	_____ linear measure	2.	A system of measuring mass or heaviness
c.	_____ weight measure	3.	A system of measuring length
d.	_____ dry measure	4.	A system of measuring duration
e.	_____ liquid measure	5.	A system of measuring dry things such as grain

2. Using a 1/16 inch scale ruler provided by the instructor, measure the following line segments. Write the measure above each segment to the nearest 1/16th inch.



3. Draw the following line segments. (Ruler will be furnished by instructor.)

   a. 7 inches

   b. 2 $\frac{1}{4}$ inches

   c. 2 $\frac{7}{8}$ inches

   d. 3 $\frac{1}{16}$ inches

MEASURES IN STANDARD SYSTEM
UNIT I

ANSWERS TO TEST

1. a. 4
   b. 3
   c. 2
   d. 5
   e. 1

2. AB = $1\frac{15}{16}$"

   CD = $2\frac{1}{4}$"

   EF = $3\frac{5}{16}$"

   GH = $3\frac{1}{4}$"

   IJ = $4\frac{1}{4}$"

3. Instructor will measure the answers to determine accuracy of drawings.

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to convert and compute measures in the standard system. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Convert linear measures to equivalent units.
2. Convert liquid measures to equivalent units.
3. Convert dry measures to equivalent units.
4. Convert weight measures to equivalent units.
5. Convert time measures to equivalent units.
6. Compute basic operations in a given measure system.

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:
    A. Objective sheet
    B. Information sheet
    C. Assignment sheets-
        1. Assignment Sheet #1--Convert linear measures in the standard system.
        2. Assignment Sheet #2--Convert liquid measures in the standard system.
        3. Assignment Sheet #3--Convert dry measures in the standard system.
        4. Assignment Sheet #4--Convert weight measures in the standard system.
        5. Assignment Sheet #5--Convert time measures into equivalent units.
        6. Assignment Sheet #6--Compute basic operations in a given standard system of measure.

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. *Basic Mathematics Simplified*, 4th Ed. Albany, NY 12205: Delmar Publishing Co., 1977.

B. Smith, Robert D. *Applied General Mathematics*. Albany, NY 12205: Delmar Publishing Co., 1983.

C. Wiltsie, David H. *Vocational Math Series, Book 2*. Bishop, CA 93514: Motivation Development, Inc., 1982.

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

INFORMATION SHEET

I. Measure Equivalents

A. Linear Measure

1 foot(ft) = 12 inches(in)
1 yard(yd) = 3 feet(ft)
1 yard(yd) = 36 inches(in)
1 rod(rd) = 16.5 feet(ft)
1 furlong = 220 yards(yd)
1 mile(mi) = 5280 feet(ft)
1 mile(mi) = 1760 yards(yd)
1 mile(mi) = 320 rods(rd)
1 mile(mi) = 8 furlongs

B. Liquid Measure
8 ounces(oz) = 1 cup
16 ounces(oz) = 1 pint(pt)
2 pints(pt) = 1 quart(qt)
4 quarts(qt) = 1 gallon(gal)

C. Dry Measure

2 pints(pt) = 1 quart(qt)
8 quarts(qt) = 1 peck(pk)
4 pecks(pk) = 1 bushel(bu)

D. Weight Measure

16 ounces(oz) = 1 pound(lb)
2000 pounds(lb) = 1 net or short ton
2240 pounds(lb) = 1 gross or long ton

E. Time

60 seconds(sec) = 1 minute(min)
60 minutes(min) = 1 hour(hr)
24 hours(hr) = 1 day(da)
7 days(da) = 1 week(wk)
4 weeks(approx.) = 1 month(mo)
12 months(mo) = 1 year(yr)
52 weeks(wk) = 1 year(yr)
365 days(da) = a common year
366 days(da) = a leap year
10 years(yr) = a decade
100 years(yr) = a century

II. Procedures

A. Expressing smaller units of measure or larger units of measure

1. Dominate numbers--Divide the larger unit by the number of smaller units contained in one of the larger units.

Example: To express 36 inches as feet;

12 inches = 1 foot; therefore,

36 - 12 = 3 feet; 36 inches = 3 feet

2. Compound dominate numbers--Divide the larger unit by the smaller unit and remainder in terms of the smaller unit.

Example: To express 22 ft as yards and ft,

3 ft = 1 yd; therefore,

$$\begin{array}{r} 7\text{ yd's }1\text{ ft} \\ 3\overline{)\,22\text{ ft}} \\ \underline{-21} \\ 1 \end{array}$$

B. Expressing larger units of measure as smaller units of measure--Multiply the smaller units by the number of smaller units contained in one of the larger units.

Example: To express $3\frac{1}{3}$ yd's as feet;

3 ft = 1 yd; therefore,

$$3\frac{1}{3} \times 3 = \frac{10}{3} \times \frac{3}{1} = 10 \text{ ft}$$

C. Addition of compound numbers

1. Arrange like units in columns.

Example: Add 6 ft 5 in and 2 ft 11 in.

$$\begin{array}{r} 6\text{ ft }5\text{ in} \\ \underline{2\text{ ft}11\text{ in}} \end{array}$$

2. Add each column.

Example:

$$\begin{array}{r} 6\text{ ft }5\text{ in} \\ \underline{2\text{ ft}11\text{ in}} \\ 8\text{ ft}16\text{ in} \end{array}$$

3. Simplify the sums, starting at the right, by dividing that sum by the number of units in one of the next larger units.

   Example: To simplify, 8ft 16in;

   12in = 1ft; therefore,

$$\begin{array}{r} 1\text{ ft} \\ 12\overline{)\,16\,} \\ \underline{12} \\ 4\text{in remainder} \end{array}$$

   Add the quotient to the column to the left.

   8ft 16in = 8ft + 1ft + 4in or

   9ft 4in.

D. Subtraction of compound measures

1. Arrange like units in columns.
2. Subtract like groups, moving right to left.

   Example:

$$\begin{array}{r} 3\text{ft } 8\text{in} \\ \underline{-1\text{ft } 2\text{in}} \\ 2\text{ft } 6\text{in} \end{array}$$

3. Regroup if necessary.

   Example:

$$\begin{array}{r} 3\text{ft } 2\text{in} \\ \underline{-1\text{ft } 4\text{in}} \end{array}$$

   4 will not subtract from 2; therefore take 1 foot from the feet column, regroup it as inches and add it to the existing inches column.

   3ft 2in becomes 2ft 12 + 2in or

   2ft 14in.

   Then:

$$\begin{array}{r} 2\text{ft } 14\text{in} \\ \underline{-1\text{ft } \;\;4\text{in}} \\ 1\text{ft } 10\text{in} \end{array}$$

E. Multiplication--Multiply each unit by the multiplier. Simplify when necessary.

Example:
```
 8ft 5in
   x 3
24ft15in = 25ft 3in
```

F. Division--Divide each unit by the divisor. Express any remainder in terms of the next smaller unit, add the remainder to the existing smaller units and continue to divide by the same divisor.

Example:
```
    2ft 5in
 3) 7ft 3in
    6    +
    1ft=12in
      3) 15in
```

(NOTE: The examples given above are linear measure. The same procedures apply to any type of measure.)

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #1--CONVERT LINEAR MEASURES IN THE STANDARD SYSTEM

Directions: Change the given measures to the indicated values by filling in the blanks.

a. 5 miles = ________ft

b. 25 ft = _________in

c. 540 yds = ________ft

d. 77 in = _________ft and _________in

e. 440 yds = ________ft

f. 88 in = ________ft and ________in

g. 90 in = ________ft and ________in

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #2--CONVERT LIQUID MEASURES IN STANDARD SYSTEM

1. Fill in the equivalent of each fluid ounce measure in the blank in the right column.

   a. 8 oz. = ________ cups

   b. 16 oz. = ________ pints

   c. 32 oz. = ________ quarts

   d. 128 oz. = ________ gallons

2. Convert the following measures as indicated.

   a. 84 pints = ________ gallons ________ quarts

   b. 2 gallons = ________ quarts

   c. 33 oz. = ________ pints ________ ounces

   d. 5 quarts 5 pints = ________ gallons ________ quarts
   ________ pints

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #3--CONVERT DRY MEASURES IN STANDARD SYSTEM

1. Fill in the blanks with the correct equivalents for dry measures.

   a. 1 quart = ________ pints

   b. 1 peck = ________ quarts

   c. 1 bushel = ________ pecks

2. Convert the following dry measures as indicated.

   a. 12 quarts = ________ pints

   b. 5 pints = ________ quarts ________ pints

   c. 15 pecks = ________ bushels ________ pecks

   d. 2 pecks = ________ quarts

   e. 15 pints = ________ quarts ________ pints

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #4--CONVERT WEIGHT MEASURES IN STANDARD SYSTEM

Directions: Convert the following weight measures as indicated.

a. 1 short ton = ________ pounds

b. 80 ounces = ________ pounds

c. 24 short tons 180lbs 30oz. reduces to ________ short tons ________ pounds ________ ounces

d. 532 ounces = ________ pounds ________ ounces

e. 3650 pounds = ________ short ton ________ pounds

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #5--CONVERT TIME MEASURES TO EQUIVALENT UNITS

Directions: Change the following times to the indicated time equivalents.

a. 25 hrs = ________ days ________ hours

b. 120 seconds = ________ minutes

c. 6184 seconds = ________ hours ________ minutes ________ seconds

d. 8 days = ________ weeks ________ days

e. 87 weeks = ________ years ________ months ________ weeks

f. 1 year = ________ weeks

g. 1 week = ________ hours

h. 1 day = ________ seconds

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ASSIGNMENT SHEET #6--COMPUTE BASIC OPERATIONS IN A GIVEN STANDARD SYSTEM OF MEASURE

Directions: Perform each function described below and record the proper answer in the blanks on the right.

1. Add:

   a. 3yds. 2ft. 2in.
   +5yds. 1ft.11in. = _____yds. _____ft. _____in.

   b. .40lbs.
   +1.35lbs. = ________lbs. or _____lbs. _____oz.

   c. 5 tons 300 pounds 14 oz.
   +2 tons1800 pounds 10 oz. = _____tons _____lbs. _____oz.

2. Subtract:

   a. 5 gals. 3 qts. 2 pts.
   -1 gal. 2 qts. 7 pts. = _____gals. _____qts. _____pts.

   b. 19 miles 440 ft. 19 in.
   - 4 miles 270 ft. 11 in. = _____miles _____ft. _____in.

   c. 13 hrs. 15 min.
   - 2 hrs. 45 min. = _____hrs. _____min.

3. Multiply:

   a. 19 ft.
   x 3 = _____ft. = _____yds.

   b. 4 gals. 1 qt.
   x 3 = _____gals. _____qts.

c. $\begin{array}{r} 12 \text{ ft. } 9 \text{ in.} \\ \underline{\times\ 3\qquad} \end{array}$ = _____ft. _____in.

4. Divide:

a. 4575 miles ÷ 5 = _____miles

b. 88 oz. ÷ 2 = _____lbs. _____oz.

c. 35 qts. 15 pts. ÷ 5 = _____qts. _____pts.

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

a. 26400 ft.
b. 300 in.
c. 1620 ft.
d. 6 ft. 5 in.
e. 1320 ft.
f. 7 ft. 4 in.
g. 7 ft. 6 in.

ASSIGNMENT SHEET #2

1. a. 1 cup
   b. 1 pint
   c. 1 quart
   d. 1 gallon
2. a. 10 gal. 2 qts.
   b. 8 qts.
   c. 2 pts. 1 oz.
   d. 1 gal. 3 qts. 1 pt.

ASSIGNMENT SHEET #3

1. a. 2 pts.
   b. 8 qts.
   c. 4 pecks
2. a. 24 pts.
   b. 2 qts. 1 pt.
   c. 3 bushels 3 pecks
   d. 16 qts.
   e. 7 qts. 1 pt.

ASSIGNMENT SHEET #4

a. 200 lbs.
b. 5 lbs.
c. 24 short tons 181 lbs. 14 oz.
d. 33 lbs. 4 oz.
e. 1 ton 1650 lbs.

ASSIGNMENT SHEET #5

a. 1 day 1 hr.
b. 2 min.
c. 1 hr. 43 min. 4 sec.
d. 1 week 1 day
e. 1 year 2 months 11 weeks
f. 52 weeks
g. 168 hrs.
h. 86400 seconds

ASSIGNMENT SHEET #6

1. a. 9 yds. 1 ft. 1 in.
   b. 1.75 lbs. or 1 lb. 12 oz.
   c. 8 tons 1011 lbs. 8 oz.

2. a. 3 gals. 2 qts. 1 pt.
   b. 15 miles 170 ft. 8 in.
   c. 10 hrs. 30 min.

3. a. 57 ft. = 19 yds.
   b. 12 gals. 3 qts.
   c. 38 ft. 3 in.

4. a. 915 miles
   b. 2 lbs. 12 oz.
   c. 8 qts. 1 pt.

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

TEST

1. Change the measures given to the equivalent amount. Use the blanks provided.

   a. 14 miles = ________ft.

   b. 880 yds. = ________miles

   c. 1320 ft. = ________miles

   d. 2000 lbs. = ________tons

   e. 90 min. = ________hrs.

   f. 2 yds. = ________in.

   g. 6 in. = ________ft.

   h. $4\frac{1}{2}$ ft. = ________in.

   i. $9\frac{3}{4}$ ft. = ________in.

2. Given liquid measures shown in the column on the left, connect them to the equivalent amount shown in the blank space provided.

   a. 1 cup = ________fluid ounces

   b. 7 pts. = ________qts.

   c. 9 qts. = ________gals.

   d. 14 gals. = ________qts.

3. Fill in the blanks provided by giving the equivalent amount as indicated.

   a. 2 pts. = ________qts.

   b. 4 qts. = ________pecks

   c. 8 qts. = ________pecks

   d. 4 pecks = ________bushel

4. Change these dry weight amounts to each equivalent by completing the blank spaces.

   a. 16 oz. = ________lbs.

   b. 2000 lbs. = ________tons

   c. 45 lbs. = ________oz.

   d. 85 tons = ________lbs.

5. List below the equivalent units of time measure in the opposite column on the right.

a. 1 hr.	________min.
b. 4 min.	________sec.
c. 1 hr. 40 min.	________min.
d. 53 seconds	________hr.
e. 59 min. 59 sec.	________hr.

6. Compute the following problems as indicated by the +, -, x, or ÷ signs. Simplify or regroup as needed.

a. 3 hr. 15 min.
-1 hr. 25 min.

b. 7 qts. 1 pt.
x 3

c. 3 days 21 hrs. 14 min. 18 sec.
+1 day 2 hrs. 50 min. 19 sec.

d. $5\overline{)\,35\text{ ft. }15\text{ in.}}$

e. 2 miles 195 yds. 2 ft. 7 in.
x 9

MEASURES EQUIVALENTS IN STANDARD SYSTEM
UNIT II

ANSWERS TO TEST

1. a. 73920 ft.
   b. $\frac{1}{2}$ mile
   c. $\frac{1}{4}$ mile
   d. 1 ton
   e. 1 $\frac{1}{2}$ hrs.
   f. 72 in.
   g. $\frac{1}{2}$ ft.
   h. 54 in.
   i. 117 in.

2. a. 8 fluid oz.
   b. 1 $\frac{3}{4}$ qts.
   c. 2 $\frac{1}{4}$ gals.
   d. 56 qts.

3. a. 1 qt.
   b. $\frac{1}{2}$ peck
   c. 1 peck
   d. 1 bushel

4. a. 1 lb.
   b. 1 ton
   c. 720 oz.
   d. 170000 lbs.

5. a. 60 min.
   b. 240 sec.
   c. 100 min.
   d. .01472
   e. .9997 hrs.

6. a. 1 hr. 50 min.
   b. 22 qts. 1 pt.
   c. 5 days 4 min. 37 seconds
   d. 7 ft. 3 in.
   e. 19 miles 2 yds. 2 ft. 3 inches

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

UNIT OBJECTIVE

After completion of this unit, the student should be able to read measures in the metric system and measure in the metric system. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Read measures within the metric system.
2. Draw linear measures within the metric system.

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

SUGGESTED ACTIVITIES

I. Provide metric rulers for students.

II. Provide student with objective sheet.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Assist students as they work through assignment sheets.

VII. Give test.

VIII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets-
  - 1. Assignment Sheet #1--Read measures in metric system.
  - 2. Assignment Sheet #2--Draw linear measures in metric system.
- D. Answers to assignment sheets
- E. Test
- F. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. Basic Mathematics Simplified, 4th Ed. Albany, NY 12205: Delmar Publishers Inc., 1977.

B. Smith, Robert D. Applied General Mathematics. Albany, NY 12205: Delmar Publishers Inc., 1983.

C. Wiltsie, David H. Vocational Math Series, Book 2. Bishop, CA 93514: Motivation Development, Inc., 1982.

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

INFORMATION SHEET

I. Basic Units in Metric System

	QUANTITY	BASIC UNIT	SYMBOL
A.	Length	meter	m
B.	Mass	kilogram	kg
C.	Time	second	s
D.	Electric current	ampere	A
E.	Temperature	kelvin	K
F.	Light intensity	candela	cd
G.	Amount of substance	mole	mol

(NOTE: A period is not used after the unit symbol. A comma is not used to separate digits in groups of three. A space is left between groups of three counting from the decimal point.)

Example: 1 063 m

II. Metric power of ten prefixes

A. Milli means one thousandth(0.001)

B. Centi means one hundredth(0.01)

C. Deci means one tenth(0.1)

D. Deca means ten(10)

E. Hecto means hundred(100)

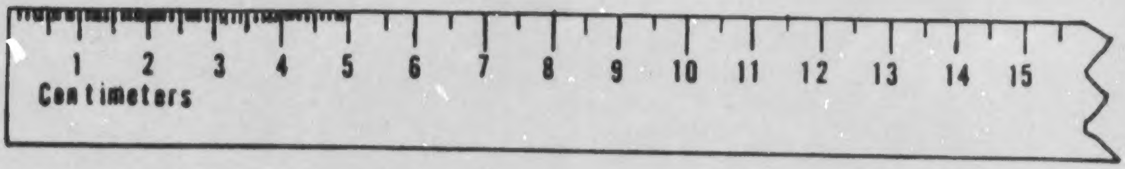
F. Kilo means thousand(1 000)

III. Frequently used metric units

	QUANTITY	UNIT	SYMBOL
A.	Length	kilometer	km
		meter	m
		centimeter	cm
		millimeter	mm

B.	Area	square kilometer	km^2
		hectare	ha
		square meter	m^2
		square centimeter	cm^2
C.	Volume or Capacity	cubic meter	m^3
		cubic decimeter	dm^3
		liter	L
		cubic centimeter	cm^3
		milliliter	mL
D.	Mass(weight)	metric ton(1 000 kg)	t
		kilogram	kg
		gram	g
		milligram	mg
E.	Time	day	d
		hour	h
		minute	min
		second	s
F.	Temperature	degree Celsius	°C
G.	Speed or Velocity	meter per second	m/s
		kilometer per hour	km/h
H.	Plane Angle	degree	°
I.	Force	kilonewton	kN
		newton	N
J.	Pressure	kilopascal	kPa
K.	Acceleration	meter per second squared	m/s^2
L.	Rotational Frequency	revolution per second	r/s
		revolution per minute	r/min
M.	Density	kilogram per cubic meter	kg/m^3
		gram per liter	g/L

IV. Reading a metric ruler



A. Scale--Metric linear measure is based upon powers of ten with the meter as the basic unit.

B. Units of linear measure

1. 1 millimeter(mm) = 0.001 meter(m)
2. 1 centimeter(cm) = 0.01 meter(m)
3. 1 decimeter(dm) = 0.1 meter(m)
4. 1 meter(m) = 1 meter(m)
5. 1 decameter(dam) = 10 meters(m)
6. 1 hectometer(hm) = 100 meters(m)
7. 1 kilometer(km) = 1 000 meters(m)

(NOTE: The same prefixes are used with each basic unit of measurement.)

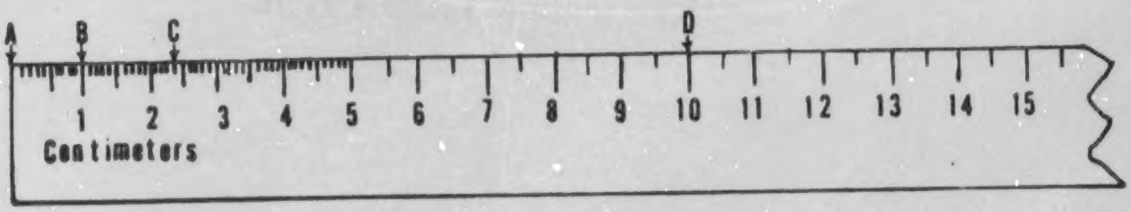
Examples: 1 000 liters = 1 kiloliter;

.001 gram = 1 milligram

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

ASSIGNMENT SHEET #1--READ MEASURES IN THE METRIC SYSTEM

1. Use the metric rule drawn below and give a reading of the points shown by the arrow.


A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Centimeters

a. AB =

b. AC =

c. AD =

2. Write the words which describe the following metric measures:

a. 1 L reads ______________________________

b. 10 mg reads ______________________________

c. 35 cm reads ______________________________

d. 45 kg reads ______________________________

e. 12 g reads ______________________________

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

ASSIGNMENT SHEET #2--DRAW LINEAR MEASURES WITHIN THE METRIC SYSTEM

Directions: Draw a line equaling the following metric linear measurements.

a. 1 mm

b. 5 cm

c. 25 mm

d. 2.5 cm

e. .5 cm

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. 1 centimeter
   b. 2.4 centimeters
   c. 10 centimeters

2. a. one liter
   b. ten milligrams
   c. thirty-five centimeters
   d. forty-five kilograms
   e. twelve grams

ASSIGNMENT SHEET #2

Instructor will measure the answers to determine accuracy of drawings.

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

TEST

1. Write the following metric measures in words.

   a. 85 mm

   b. 45 mm

   c. .675 m

   d. 140 cm

   e. 23 dm

2. Draw the straight lines for the following metric measurements (Please use the ruler furnished to you.).

   a. forty-four millimeters

   b. two and seven tenths centimeters

   c. one half decimeter

   d. one decimeter

   e. fifteen centimeters

MEASURES NOTATION IN METRIC SYSTEM
UNIT III

ANSWERS TO TEST

1. a. eighty-five millimeters
   b. forty-five millimeters
   c. six hundred seventy-five thousandths meter
   d. one hundred forty centimeters
   e. twenty-three decimeters

2. Instructor will measure the answers to determine accuracy of drawings.

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

UNIT OBJECTIVE

After completion of this unit, the student should be able to convert measures within the metric system. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Convert linear measures to equivalent units.
2. Convert capacity measures to equivalent units.
3. Convert weight measures to equivalent units.
4. Add and subtract in a given metric measures system.

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:
   A. Objective sheet
   B. Information sheet
   C. Assignment sheets-
      1. Assignment Sheet #1--Convert linear measures to equivalent units in metric system.
      2. Assignment Sheet #2--Convert capacity measures to equivalent units in metric system.
      3. Assignment Sheet #3--Convert weight measures to equivalent units in metric system.
      4. Assignment Sheet #4--Add and subtract in a given metric measures system.
   D. Answers to assignment sheets
   E. Test

F. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. *Basic Mathematics Simplified*, 4th Ed. Albany, NY 12205: Delmar Publishers Inc., 1977.

B. Smith, Robert D. *Applied General Mathematics*. Albany, NY 12205: Delmar Publishers Inc., 1983.

C. Wiltsie, David H. *Vocational Math Series, Book 2*. Bishop, CA 93514: Motivation Development, Inc., 1982.

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

INFORMATION SHEET

I. Measures Equivalents

A. Metric Units of Linear Measure

10 millimeters(mm) = 1 centimeter(cm)
10 centimeters(cm) = 1 decimeter(dm)
10 decimeters(dm) = 1 meter(m)
10 meters(m) = 1 decameter(dam)
10 decameters(dam) = 1 hectometer(hm)
10 hectometers(hm) = 1 kilometer(km)

B. Metric Units of Capacity Measure

10 milliliters(ml) = 1 centiliter (cl)
10 centiliters(cl) = 1 deciliter (dl)
10 deciliters(dl) = 1 liter(l)
10 liters(l) = 1 decaliter (dal)
10 decaliters(dal) = 1 hectoliter (hl)
10 hectoliters(hl) = 1 kiloliter (kl)

C. Metric Units of Weight(Mass) Measure

10 milligrams(mg) = 1 centigram(cg)
10 centigrams(cg) = 1 decigram(dg)
10 decigrams(dg) = 1 gram(g)
10 grams(g) = 1 decagram(dag)
10 decagrams(dag) = 1 hectogram(hg)
10 hectograms(hg) = 1 kilogram(kg)
1 000 kilograms(kg) = 1 metric ton(t)

II. Procedures

A. To change from one size unit to another, move the decimal point. The prefix tells what multiple a unit is of the basic unit.

Example: 1 000 grams = 1 kilogram because kilo
means 1000 x basic unit(gram).

B. To change a given unit to a smaller unit, move the decimal point to the right.

Example: 1 cm = 10 mm

(NOTE: The decimal point was moved one place to the right because mm is one unit smaller than cm. By moving the decimal to the right, you are actually multiplying by 10.)

C. To change a given unit to a larger unit, move the decimal point to the left.

Example: 1 dm = .01 m

(NOTE: The decimal point was moved one place to the left because m is one unit larger than dm. By moving the decimal to the left, you are actually dividing by 10.)

D. Addition and Subtraction of Metric Measure

1. Only like units can be added or subtracted.

   Example: 0.05 m + 6.8 dm + 50 cm + 225 m cannot be added in these forms.

2. Express the measures in like terms and add.

   Example: 0.04 m = 4 cm(decimal point moved 2 places to right)
   6.9 dm =69 cm(decimal pcint moved 1 place to right)
   150 cm=150 cm
   225 mm =22.5cm(decimal point moved 1 place to left)
   245.5 cm ANSWER

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ASSIGNMENT SHEET #1--CONVERT LINEAR MEASURES TO EQUIVALENT UNITS IN METRIC SYSTEM

1. Make the following linear conversions.

   a. 95 m = ________km

   b. 32.5 cm = ________mm

   c. 75 mm = ________cm

   d. 2873 m = ________km

   e. 7.3 mm = ________cm

2. Match the following units in column A with their equivalent in column B. Record your answer in the blanks in column A.

Column A	Column B
1. 1 millimeter = _____cm	a. 1000
2. 1 millimeter = _____m	b. .001
3. 1 meter = _____mm	c. 0.1
4. 1 meter = _____km	d. .001

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ASSIGNMENT SHEET #2--CONVERT CAPACITY MEASURES TO EQUIVALENT UNITS IN METRIC SYSTEM

Directions: Fill in the blanks with the indicated capacity measures equivalent.

a. 892 ml = ________ l

b. 0.48 l = ________ ml

c. 7000 ml = ________ l

d. 1 L = ________ ml

e. 100 ml = ________ l

f. 10 l = ________ ml

g. 2.4 l = ________ ml

h. 300 ml = ________ l

i. 1 l = ________ ml

j. 1500 ml = ________ l

k. 1.5 l = ________ ml

l. 900 ml = ________ l

m. 2.5 l = ________ ml

n. 500 ml = ________ l

o. 250 ml = ________ l

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ASSIGNMENT SHEET #3--CONVERT WEIGHT MEASURES TO EQUIVALENT UNITS IN METRIC SYSTEM

1. Make the following weight conversions. Round the answer to two decimal places.

   a. 1.72 g = ________mg

   b. 890 mg = ________g

   c. 2.6 metric tons = ________kg

   d. 1 230 g = ________kg

   e. 0.6 kg = ________g

   f. 0.04 g = ________mg

2. Match the following units in column A with their equivalent in column B. Record your answer in the blank in column A.

Column A	Column B
1. 100 grams = _____milligrams	a. 1
2. 1 000 milligrams = _____gram	b. 100 000
3. 1 metric ton = _____kilograms	c. 1 000
4. 4 000 milligrams = _____ grams	d. 4

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ASSIGNMENT SHEET #4--ADD AND SUBTRACT IN A GIVEN METRIC MEASURES SYSTEM

1. Add the following metric measures. Be sure to express the measures in like terms before adding. Express answer in the most convenient unit that is commonly used.

   a. .035 km + 65 m + .16 km = ________m

   b. 8.62 m + 87 cm = ________cm

   c. 7 g + 10.5 g + 22 g + 18 g = ________g

   d. 8.6 cm + 18.9 mm = ________mm

   e. 83.6 dm + 263 mm + 3.3 m = ________dm

2. Subtract.

   a. 2.3 m - 183 cm = ________cm

b. 811.3 cm - 4.2 m = ________cm

c. .085 kl - 16 l = ________ml

d. 2.145 cm - 3 mm = ________mm

e. 13.68 cm - 9.32 cm = ________cm

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. a. .095 km
   b. 325 mm
   c. 7.5 cm
   d. 2.873 km
   e. .73 cm

2. 1. c
   2. b or d
   3. a
   4. d or b

ASSIGNMENT SHEET #2

a. .892 l
b. 480 ml
c. 7 l
d. 1 000 ml
e. 1 l
f. 10 000 ml
g. 2 400 ml
h. 300 l
i. 1 000 ml
j. 1.5 l
k. 1 500 ml
l. .9 l
m. 2 500 ml
n. .5 l
o. .25 l

ASSIGNMENT SHEET #3

1. a. 1 720 mg
   b. 0.89 g
   c. 2 600 kg
   d. 1.23 kg
   e. 600 g
   f. 40 mg

2. 1. b
   2. a
   3. c
   4. d

ASSIGNMENT SHEET #4

1. a. 260 m
   b. 9.49 m or 949 cm
   c. 57.5 g
   d. 104.9 mm
   e. 119.23 dm

2. a. 47 cm
   b. 391.3 cm
   c. 5.63 mL
   d. 18.45 mm
   e. 4.36 cm

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

TEST

1. Write measures to the equivalent units of linear metric measure.

   a. 8 kilometers = ________meters

   b. 500 meters = ________kilometers

   c. 44 centimeters = ________millimeters

   d. 85 millimeters = ________meters

   e. 850 millimeters = ________centimeters

   f. 20 decimeters = ________millimeters

2. Convert measures to equivalent units in capacity measure.

   a. 300 liters = ________milliliters

   b. 5 cubic centimeters = ________milliliters

   c. 9 decaliters = ________milliliters

   d. 1500 milliliters = ________liters

   e. 44 milliliters = ________liters

   f. 44 centiliters = ________deciliters

   g. 75 deciliters = ________liters

3. Convert measures to equivalent units of weight measure.

   a. 400 milligrams = ________centigrams

   b. 28 centigrams = ________decigrams

   c. .4 decigrams = ________grams

   d. 2 metric tons = ________kilograms

4. Solve the following problems using the operation indicated by the given symbol.

   a. 244 mm + 37 mm = __________

   b. 37 cm + 44 mm = __________

   c. 540 m + 77 km = __________

   d. 84 cm - 36 cm = __________

   e. 1 m - 36 cm = __________

   f. 53 km - 370 m = __________

MEASURES EQUIVALENTS IN METRIC SYSTEM
UNIT IV

ANSWERS TO TEST

1. a. 8 000 meters
   b. .5 kilometer
   c. 440 millimeters
   d. .085 meters
   e. 85 centimeters
   f. 2 000 millimeters

2. a. 300 000 milliliters
   b. 5 milliliters
   c. 90 000 milliliters
   d. 1.5 liters
   e. .044 liter
   f. 4.4 deciliters
   g. 7.5 liters

3. a. 40 centigrams
   b. 2.8 decigrams
   c. .04 gram
   d. 2 000 kilograms

4. a. 281 mm
   b. 414 mm
   c. 77 540 m
   d. 48 cm
   e. 64 cm
   f. 52 630 m

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

UNIT OBJECTIVE

After completion of this unit, the student should be able to convert a given measure from one system to another. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Convert given measures from one measures system to another.

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

- A. Objective sheet
- B. Information sheet
- C. Assignment sheets-
  - 1. Assignment Sheet #1--Convert given measures from one system to another.
- D. Answers to assignment sheets
- E. Test
- F. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. Basic Mathematics Simplified. 4th Ed. Albany, NY 12205: Delmar Publishers Inc., 1977.

B. Smith, Robert D. *Applied General Mathematics.*
Albany, NY 12205: Delmar Publishers Inc., 1983.

C. Wiltsie, David H. *Vocational Math Series, Book 2.*
Bishop, CA 93514: Motivation Development, Inc.,
1982.

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

INFORMATION SHEET

I. Equivalency Tables

A. Linear Measure

1. Metric to Standard Units

a. 1 millimeter(mm) = 0.03937 inch(in)

b. 1 centimeter(cm) = 0.3937 inch(in)

c. 1 meter(m) = 39.37 inches(in)

d. 1 meter(m) = 3.2808 feet(ft)

e. 1 kilometer(km) = 0.6214 mile(mi)

2. Standard to Metric Units

a. 1 inch(in) = 25.4 millimeters(mm)

b. 1 inch(in) = 2.54 centimeters(cm)

c. 1 foot(ft) = 0.3048 meter(m)

d. 1 yard(yd) = 0.9144 meter(m)

e. 1 mile(mi) = 1.609 kilometers(km)

B. Capacity Measure

1. Metric to Standard Units

a. 1 milliliter(mL) = 0.034 ounce(oz)

b. 1 liter(L) = 1.057 quarts(qt)

c. 1 liter(L) = 0.264 gallon(gal)

2. Standard to Metric Units

a. 1 ounce(oz) = 29.563 milliliters(mL)

b. 1 quart(qt) = 0.946 liter(L)

c. 1 gallon(gal) = 3.785 liters(L)

C. Weight(Mass) Measure

1. Metric to Standard Units

   a. 1 gram(g) = 0.035 ounce(oz)

   b. 1 kilogram(kg) = 2.205 pounds(lb)

   c. 1 metric ton(t) = 1.102 short tons

   d. 1 metric ton(t) = 0.984 long ton

2. Standard to Metric Units

   a. 1 ounce(oz) = 28.348 grams(g)

   b. 1 pound(lb) = 0.454 kilogram(kg)

   c. 1 short ton = 0.907 metric ton(t)

   d. 1 long ton = 1.016 metric tons(t)

(NOTE: It is sometimes necessary to express equivalent measurements between systems. The equivalents listed above are those most commonly used.)

II. Procedures--To express a unit given in one measurement as a unit in the other system, multiply the given measurement by the appropriate equivalent factor in the equivalency table.

(NOTE: The procedure is the same for linear, capacity, and weight measures.)

Examples: Express 3.5 inches as centimeters.

A. 1 in = 2.54 cm

B. 3.5 x 2.54 = 8.89 cm

Express 5.2 centimeters as inches.

A. 1 cm = 0.3937 in

B. 5.2 x 0.3937 = 2.047 in

Express 20 ounces as milliliters.

A. 1 oz. = 29.563 mL

B. 20 x 29.563 = 591.26 mL

Express 28.65 liters as gallons.

A. 1 liter = 0.264 gallon

B. 28.65 x 0.264 = 7.56 gal.

Express 35 pounds as kilograms.

A. 1 pound = 0.454 kilogram

B. 35 x 0.454 = 15.89 kg

Express 8.26 metric tons as short tons.

A. 1 metric ton = 1.102 short tons

B. 8.26 x 1.102 = 9.10 short tons

(NOTE: The answers in the examples above are rounded to two decimal places.)

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

ASSIGNMENT SHEET #1--CONVERT GIVEN MEASURES FROM ONE SYSTEM TO ANOTHER

Directions: Fill in the blank following the given measure with the equivalent measure. You may use the equivalency tables in the information sheet.

1. a. 1 inch = ________mm
   b. 1 inch = ________cm
   c. 1 inch = ________dm
   d. 1 meter = ________inches
   e. 44 mm = ________inches
   f. 15 kilometers = ________ft.

2. a. 7 gallons = ________liters
   b. 4 gallons = ________liters
   c. 9.6 liters = ________quarts
   d. 3.4 ounces = ________milliliters
   e. 2.63 quarts = ________liters
   f. 3850 milliliters = ________liters

3. a. 0.8 pounds = ________ounces
   b. 0.85 kilograms = ________grams
   c. 3.06 grams = ________milligrams
   d. 105.3 pounds = ________kilograms
   e. 2.84 metric tons = ________pounds
   f. 63.9 short tons = ________metric tons

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

ANSWERS TO ASSIGNMENT SHEET #1

1. a. 25.4 millimeters
   b. 2.54 centimeters
   c. .254 decimeters
   d. 39.37 inches
   e. 1.73 inches
   f. 49214,88 ft.
2. a. 26.495 liters
   b. 15.14 liters
   c. 10.147 quarts
   d. 100.514 milliliters
   e. 2.488 liters
   f. 3.85 liters
3. a. 12.8 ounces
   b. 850 grams
   c. 3060 milligrams
   d. 47.806 kilograms
   e. 6259.36 pounds
   f. 57.957 metric tons

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

TEST

1. Listed below are conversions between the two systems that you will use the most. Fill in the blank with the correct equivalent. You may use the equivalency tables in the information sheet.

a. 1 inch = __________millimeters

b. 1 mile = __________kilometers

c. 1 inch = __________centimeters

d. 1 foot = __________centimeters

e. 1 yard = __________meters

2. Now that you have completed the conversion from standard to metric, try a switcharound and convert from metric to standard.

a. 25.4 mm = __________inch

b. 1000 mm = __________inches

c. 7.621 cm = __________inches

d. 30 cm = __________ft.

e. 8 kilometers = __________miles

MEASURES CONVERSION FROM SYSTEM TO SYSTEM
UNIT V

ANSWERS TO TEST

1. a. 25.4 millimeters

   b. 1.6 kilometers

   c. 2.54 centimeters

   d. 30.48 centimeters

   e. .914 meters

2. a. 1 inch

   b. 39.375 inches

   c. 3 inches

   d. 1 foot (0.984252 ft.)

   e. 4.9712 miles

MEASURES WORD PROBLEMS
UNIT VI

UNIT OBJECTIVE

After completion of this unit, the student should be able to estimate and find the solution to word problems involving measures. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Interpret word problems using measures into number problems and solve problems.
2. Estimate the reasonableness of a solution to a given measures problem.

MEASURES WORD PROBLEMS
UNIT VI

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Interpret and solve measures word problems.

    2. Assignment Sheet #2--Estimate the reasonableness of given measures problems.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

  A. Kerr, Donald R. Basic Mathematics: Arithmetic with an Introduction to Algebra. New York, NY 10036: McGraw-Hill, Inc., 1980.

B. Lawling, Betty S. Solving Mathematical Word Problems. Albany, NY 12205: Delmar Publishers Inc., 1983.

MEASURES WORD PROBLEMS
UNIT VI

INFORMATION SHEET

I. Procedures for Solving Measures Word Problems

  A. Read the problem carefully.

  B. Draw a sketch of the information needed to solve the problem, if possible.

  C. Decide what you are to find.

  D. Determine the necessary information given in the problem.

  E. Decide what operations are needed to solve the problem.

  F. Write the problem in mathematical terms.

  G. Make any unit conversions needed.

  H. Decide on a reasonable answer.

  I. Solve the problem.

  J. Check the answer.

II. Types of Estimation

  A. Truncating--The estimation process of replacing all the numbers to the right of a given place value with 0's.

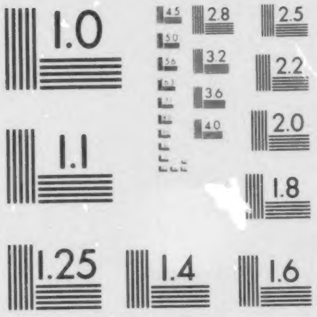
  Examples: 157 truncated to the 10's place is 150;
  4792 truncated to the 100's place is 4700.

  (NOTE: The truncated number is always smaller than the original number.)

  B. Rounding--The estimation process of expressing a number in nearest even units

    1. To round off a number to a given place, look at the number in the place immediately to the right.

PG


1.0
4.5
5.0
5.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

2. If that number to the right is less than 5, the number to be rounded stays as it is.

3. If that number to the right is 5 or greater, the number to be rounded is increased by 1.

Examples: 582 rounded to hundreds = 600;

582 rounded to tens = 580;

532 rounded to hundreds = 500;

532 rounded to tens = 530.

(NOTE: Rounding is more accurate than truncating when the number to the right of the place estimated is 5 or greater.)

Example: 582 truncated to hundreds = 500
582 rounded to hundreds = 600;
Thus rounding is more accurate
because 582 is nearer to 600 than 500.

(NOTE: Both truncating and rounding are useful in estimation. The choice of which to use depends upon the degree of accuracy desired by the estimator.)

MEASURES WORD PROBLEMS
UNIT VI

ASSIGNMENT SHEET #1--INTERPRET AND SOLVE MEASURES WORD PROBLEMS

1. If you were to swim .75 kilometers, how many feet would you have swum?

2. How many meters will the marathon runner travel in an 8 kilometer run?

3. If an automobile goes 1600 kilometers on 250 liters of gasoline, how many kilometers does it go per liter?

4. A sheet of sand paper is 11 $\frac{1}{2}$" long or 29.2 centimeters long. Are these two measurements equal? Yes or No?

5. The work piece in the lathe is 37" long. Express the length in metric measure of millimeters.

6. Figs are selling at the fruit market for nine cents per ounce. If the packages show a weight of 448 grams, how much will the cost be per package?

MEASURES WORD PROBLEMS
UNIT VI

ASSIGNMENT SHEET #2--ESTIMATE THE REASONABLENESS OF SOLUTION TO GIVEN MEASURES PROBLEMS

1. Estimate the following problems by truncation and by rounding.

	truncated	rounded
a. 43" +97" (estimate to 10's place)	__________	__________
b. 605' -299' (estimate to 100's place)	__________	__________
c. 69' x21 (estimate to 10's place,	__________	__________
d. 22)684' (estimate to 10's place)	_______	__________

2. Estimate the answers to these problems and check(X) the ones that are wrong.

a. 43 + 97 = 1409

b. 88 + 77 = 165

c. 14 + 86 = 99

d. 14.756 + 29.441 = 32.441

MEASURES WORD PROBLEMS
UNIT VI

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. 2460 ft. 11 $\frac{1}{4}$ inches
2. 8000 meters
3. 6.4 kilometers
4. yes
5. 939.8 mm
6. $1.44

ASSIGNMENT SHEET #2

1.

	T	R
a.	130	140
b.	800	900
c.	1200	1400
d.	30	35

2. a, c and d should be checked as wrong.

MEASURES WORD PROBLEMS
UNIT VI

TEST

1. Write the measurements of the objects described below, using standard measure units and metric units and set up problems for solution.

   "Ace" Construction Co. is under contract to build a small office building. The lower part will be excavated for warehouse use. The following dimensions are used to set up the measurements.

   Length of building - 140 ft. 6 inches

   Width of building - 80 feet

   Width of footing - 18 inches

   Height of foundation wall - 10 ft.

   Height of building - 27 ft. 9 inches

   a. What is the length of this building in meters?

   b. What is the width of the building in yards?

   c. What is the height of the foundation in inches?

   d. What is the height of the building in meters? in centimeters?

   e. What is the width of the footing in centimeters? in millimeters?

Four standard increments of linear measure are the mile, the yard, the foot, and the inch. Circle the appropriate measure designation below.

f. The distance from New York to New Orleans is usually measured in miles yards feet inches.

g. The football field is usually divided into miles yards feet inches.

h. The length of the building is usually measured in miles yards feet inches.

i. The thickness of the guage block is usually measured in miles yards feet inches.

2. Estimate the nearest correct answer.

The part being machined is cut from a large stock sheet 48 inches wide by 96 inchew long and 1/8 inch thick.

a. The part being cut from this stock material is 9 inches long and 4 inches wide. Circle the closest number of 9 inch lengths that can be cut from the length of stock material.

7 11 9 10

b. Estimate how many widths can be cut using a 4-inch measurement.

12 11 13 7

c. What is the reasonable number of pieces that can be cut from this stock size. Circle the answer that is most correct.

55 44 40 120 125

d. Twenty of these parts are stacked one on another. The heighth of this stack is nearest to:

1.9 inches 2.6 inches 2.3 inches

MEASURES WORD PROBLEMS
UNIT VI

ANSWERS TO TEST

1. a. 42.82 meters
    b. 26.67 yards
    c. 120 inches
    d. 8.457 meters, 845.71 centimeters
    e. 45.72 centimeters, 457.2 millimeters
    f. miles
    g. yards
    h. feet
    i. inches

2. a. 10
    b. 12
    c. 125
    d. 2.6" (actually 2.5" is the only correct answer)

MEASURES - PERIMETER, AREA, AND VOLUME
UNIT VII

UNIT OBJECTIVE

After completion of this unit, the student should be able to find the perimeter and area of given figures. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Compute the perimeter of squares, rectangles, triangles, and the circumference of circles.
2. Compute the square of a given number.
3. Derive the square root of a number, from an electronic calculator so equipped, from a set of square root tables, or by the algorithm.
4. Compute the unknown side of a right triangle, given the two known sides.
5. Compute the area of squares, rectangles, triangles, and circles.
6. Compute the volume of cube, rectangular solid, cylinder, and sphere.

MEASURES - PERIMETER, AREA, AND VOLUME
UNIT VII

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

   A. Objective sheet

   B. Information sheet

   C. Assignment sheets

      1. Assignment Sheet #1--Compute the perimeter of squares, rectangles, triangles, and circumference of circles.

      2. Assignment Sheet #2--Compute the square of a given number.

      3. Assignment Sheet #3--Compute the area of squares, rectangles, triangles, and circles.

      4. Assignment Sheet #4--Compute the volume of cube, rectangular solid, cylinder, and sphere

   D. Answers to assignment sheets

   E. Test

   F. Answers to test

II. References

A. Olivo, C. Thomas and Thomas P. Olivo. Basic Mathematics Simplified, 4th Ed., Albany, NY: Delmar Publishers, Inc., 1977.

B. Smith, Robert D. Applied General Mathematics. Albany, NY: Delmar Publishers, Inc., 1983.

C. Wiltsie, David H. Vocational Math Series, Book 2. Bishop, CA: Motivation Development, Inc., 1982

MEASURES - PERIMETER, AREA, AND VOLUME
UNIT VII

INFORMATION SHEET

I. Terms and Definitions

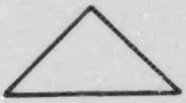
A. Plane figures--Flat figures with two dimensions.

B. Solid figures--Figures with three dimensions.

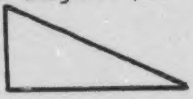
C. Square--A four-sided figure; all sides are equal in length and the opposite sides are parallel; each interior angle = 90 ; sum of interior angles is 360 .

D. Rectangle--A four-sided figure; opposite sides are parallel and equal in length; each interior angle = 90 ; sum of interior angles is 360 .

E. Triangle--A three-sided figure; sum of interior angles = 180 .

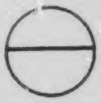


F. Right Triangle--A triangle in which one interior angle is a right angle (or an angle of 90°.)

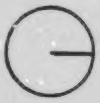


G. Circle--A figure formed by a single closed curve, all of whose points are equidistant from its center.

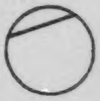
H. Diameter of a circle--A line drawn through the center of a circle.



I. Radius of a circle--A line drawn from the center of a circle to a point on the circle.



J. Chord--A line drawn between two points on a circle that does not pass through the center of the circle.



K. Circumference--The distance around a circle.

L. pi(π)--A mathematical constant expressed as $\frac{22}{7}$ or 3.1416.

M. Perimeter--The sum of the distances around the edges of a plane figure.

N. Area--The number of square units of surface space contained in a plane figure.

II. Formulas

A. Symbols

1. l = length
2. w = width
3. h = heighth
4. a = altitude(same as heighth)
5. d = diameter
6. s = side
7. b = base
8. r = radius

B. Perimeter

1. Square--$P = 4s$
2. Rectangle--$P = 2l + 2w$
3. Triangle--$P = S_1 + S_2 + S_3$
4. Right Triangle--$P = a^2 + b^2 = c^2$

   NOTE: Sides a, b and hypotenuse c.
5. Circle (circumference)--$C = 2\pi r$ or πd

C. Area

1. Square--$A = S^2$
2. Square Root-- $\sqrt{A} = S$ such that $S^2 = A$
3. Rectangle--$A = lw$
4. Triangle--$A = 1/2\ bh$
5. Triangle--$A = \sqrt{s(s-a)(s-b)(s-c)}$. When the three sides are known and the height (b) is unknown; s is 1/2 perimeter and a, b and c are the three sides of the triangle.
6. Circle--$A = \pi r^2$

D. Volume--the number of cubic units in a three-dimensional figure

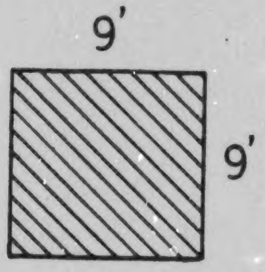
1. Cube--$V = S^3$
2. Rectangular Solid--$V = lwh$
3. Cylinder--$V = r^2 h$
4. Sphere--$\frac{4\ r^2}{3}$

III. Squaring a Number--That number multiplied by itself, used in determining area; indicated by ^{2} after the number.

Example: 9 feet x 9 feet = 81 square feet

or

9 ft^2 = 81 square feet

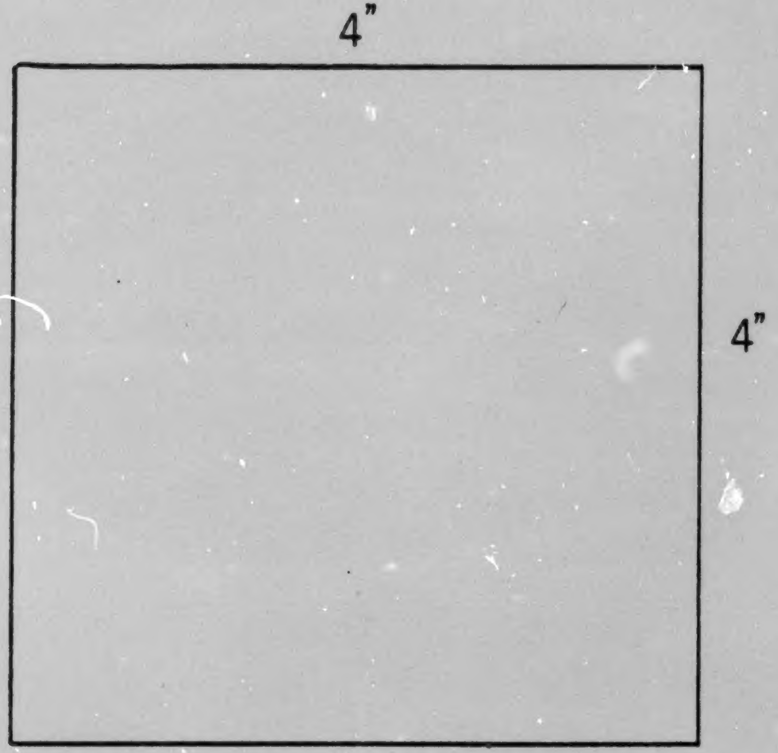


MEASURES - PERIMETER, AREA AND VOLUME
UNIT VII

ASSIGNMENT SHEET #1--COMPUTE THE PERIMETER OF SQUARES, RECTANGLES, TRIANGLES, AND THE CIRCUMFERENCE OF CIRCLES

Directions: Solve for the measurements of the perimeters of the following geometrical shapes, use formulas given with each problem.

1. The square shown below has sides 4" long. Solve for the perimeter of this square.



2. Solve for the perimeter of a rectangular piece of metal which is 44" wide and 80" long.

3. Find the perimeter of the triangle if the sides are twelve, fourteen, and eighteen inches long.

4. The top of a barrel is 22" in diameter. What is the circumference of the top of the barrel?

MEASURES - PERIMETER, AREA AND VOLUME
UNIT VII

ASSIGNMENT SHEET #2--COMPUTE THE SQUARE OF A GIVEN NUMBER

Directions: Find the square of the following numbers. Round answers to three places beyond the decimal. Be sure to include correct unit with your answer.

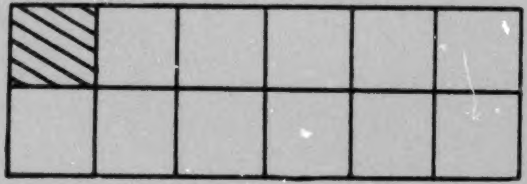
1. $(1\frac{1}{4})^2$
2. $(5\frac{3}{4})^2$
3. $(7)^2$
4. $(25.4\text{ mm})^2$
5. $(7.75\text{ cm})^2$
6. $(9\text{ yds.})^2$
7. $(12\text{ in.})^2$
8. $(85.3\text{ ft.})^2$
9. $(44\text{ m})^2$
10. $(75\text{ miles})^2$

MEASURES - PERIMETER, AREA AND VOLUME
UNIT VII

ASSIGNMENT SHEET #3--COMPUTE THE AREA OF SQUARES, RECTANGLES, TRIANGLES AND CIRCLES

Directions: Solve these problems.

1. The shaded area is 1mm long on each side. The area of this is measured in square units $(1)^2$ or 1 square millimeter. This figure is 6mm by 2mm. What is the area of the entire figure in square millimeters?



2. Find the area of a square which is 9.5 inches on each side.

3. Find the area of a triangle which is 10" high and has a base of 13.75".

4. Find the area of a rectangle 22" long by 11" wide.

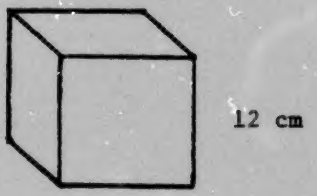
5. Find the area of a circle with a radius of 10 $\frac{1}{2}$".

6. Find the area of a circle with a diameter of 20".

MEASURES - PERIMETER, AREA, AND VOLUME
UNIT VII

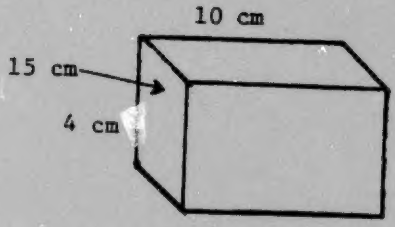
ASSIGNMENT SHEET #4--COMPUTE THE VOLUME OF A CUBE, RECTANGULAR

1.



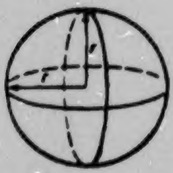
a. Volume of Cube = ______ cm^3

2.



a. Volume of Rectangular Solid = ______ cm^3

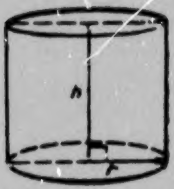
3.



radius = 6 cm

a. Volume of Sphere = ______cm^3

4.



height = 15 cm

radius = 6.5

a, Volume of Cyliner = ______cm^3

MEASURES - PERIMETER AND AREA
UNIT VII

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. 56
2. 248
3. 44
4. 69.12

ASSIGNMENT SHEET #2

1. $1\frac{9}{16}$
2. $33\frac{1}{16}$
3. 49
4. 645.16 sq. mm
5. 60.0625 sq. cm
6. 81 sq. yds.
7. 144 sq. in.
8. 7276.09 sq. ft.
9. 1936 sq. m
10. 5625 sq. miles

ASSIGNMENT SHEET #3

1. 12 sq. mm
2. 90.25
3. 68.75
4. 242
5. 346.36 (Answers may vary slightly according to the value of π used)
6. 314 sq. in.

ASSIGNMENT SHEET #4

1. a. 1728 cm^3

2. a. 600 cm^3

3. a. 150.72 cm^3

4. a. 1989.975 cm^3

MEASURES - PERIMETER AND AREA
UNIT VII

TEST

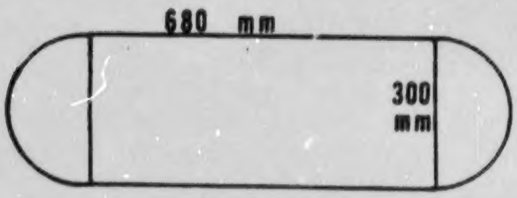
1. a. A circle has a radius of 20". What is the perimeter of this circle?

   b. What is the perimeter of a field that is 780' long and is a square in shape?

   c. The adjoining field to the previous problem is in the shape of a rectangle 2433' 7" x 250'. How many feet of fencing is required to surround this plot of land?

   d. A triangular roof gable is 40' along the base and has support rafters 24' in length. What is the perimeter of the rafters and the base which form this shape?

   e. What is the perimeter of the semi-circular-sided figure shown? Give your answer in millimeters.



2. a. Square the following whole numbers:

2

4

8

16

10

b. $(12)^2 + (13)^2 + (25)^2 =$ ______________

c. Square units are usually indicated by symbols or abbreviations that have an exponent above and toward the end. Give six examples of naming square units properly.

____

____

____

____

____

____

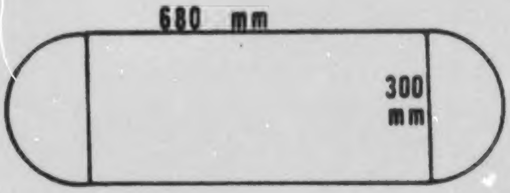
3. a. A room is 27' long and 27' wide. All sides are equal. How many square yards of flooring are needed?

b. A rectangle is 20 mm wide and 75 mm long. Give the area measurement in square centimeters.

c. Triangles are enclosed figures with three sides. If the height of a triangle is 7½" and the base is 28", how many square inches of aluminum foil would be needed to cover it completely?

d. How much paint is required to give the cable described in 1d 2 coats if a gallon of paint will cover 350 sq.ft.?

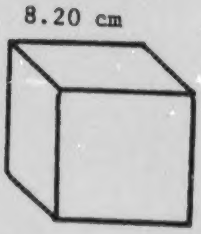
e. Find the area in square centimeters of this shape.



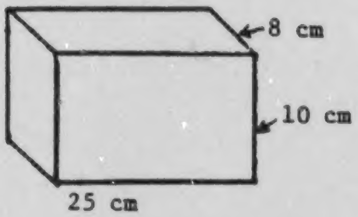
f. To find the area of a round flat surface, it is necessary to square the ________________ and multiply by π.

g. A circle has a radius of 20". What is the area of this circle?

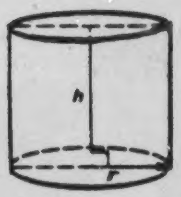
4.



a. Volume of Cube = ____________ cm^3


8 cm
10 cm
25 cm

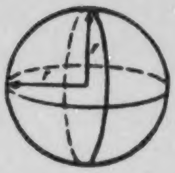
b. Volume of Rectangular Solid = ________________ cm^3



height 15 cm

radius 8.25 cm

c. Volume of Cyliner = ________________ cm^3



radius = 5.66 cm

d. Volume of Sphere = ________________ cm^3

MEASURES - PERIMETER AND AREA
UNIT VII

ANSWERS TO TEST

1. a. 125.66"
   b. 3120'
   c. 5367.2'
   d. 88'
   e. 2302.45 mm

2. a. 4, 16, 64, 256, 100
   b. 144 + 169 + 625 = 938
   c. Answers such as cm^2, in^2, ft^2, mm^2, m^2, yds^2, sec^2, etc.

3. a. 81 square yards
   b. 15 square centimeters
   c. 105 square inches
   d. 1.516 gallons
   e. 2746.858 square centimeters
   f. radius or $(r)^2$
   g. 1256.64 square inches

4. a. 551.368 cm^3
   b. 2000 cm^3
   c. 3205.7437 cm^3
   d. 134.12237 cm^3

TABLE AND GRAPH INTERPRETATION
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to interpret tables and graphs. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Interpret data illustrated by a table.
2. Interpret data represented by a line graph.
3. Interpret data represented by a bar graph.
4. Interpret data represented by a circle graph.
5. Interpret data represented by a pictograph.

TABLE AND GRAPH INTERPRETATION
UNIT I

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:
  A. Objective sheet
  B. Information sheet
  C. Assignment sheets
    1. Assignment Sheet #1--Interpret data illustrated by a table.
    2. Assignment Sheet #2--Interpret data illustrated by a line graph.
    3. Assignment Sheet #3--Interpret data illustrated by a bar graph.
    4. Assignment Sheet #4--Interpret data illustrated by a circle graph.
    5. Assignment Sheet #5--Interpret data illustrated by a pictograph.

D. Answers to assignment sheets

E. Test

F. Answers to test

II. References

A. Shea, James T. Basic Essentials of Math, Part II, 2nd ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

TABLE AND GRAPH INTERPRETATION
UNIT I

INFORMATION SHEET

I. Terms and Definitions

A. Table--A method of arranging facts and figures in an orderly sequence.

B. Data--Factual information collected for a purpose. (NOTE: We are concerned primarily with numerical data.)

C. Horizontal Scale--The scale found along the bottom of the graph. It increases from left to right.

D. Vertical Scale--The scale found along the left side. It increases from bottom to top and has the same origin as the bottom scale.

E. Graph--A picture or diagram which is used to illustrate the relationship between two or more things.

F. Bar Graph--Graph that uses bars to represent data. The bars can be horizontal or vertical.

G. Legend--An explanation of the symbols used in the graph.

H. Sectors--The divisions in a circle graph.

I. Label--The title of each sector.

J. Pictograph--A method of presenting data by using a symbol to represent a given quantity.

K. Symbol--This is usually a small picture which depicts what the graph is about. For example, if a graph was about pizza sales, the symbol might be a small pizza.

II. Interpreting a table graph

A. Find the title, heading, and subheadings for the table. This identifies the purpose of the table.

B. Find the rows in the table. These are on the left.

C. Note the relationship between the entry in each row and the information adjacent to it in each column.

D. To use a table, locate the row and column corresponding to the information needed and read the data found where the row and column intersect.

Example: In the table below, each family member has a row. The columns are the days spent fishing.

The Smith Family Fishing Trip

Number of Fish Caught						
PERSON						
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Grandad	1	1	2	3	1	0
Grandma	3	2	0	1	0	2
Jane	4	0	1	2	0	1
John	0	0	3	0	1	3
Rodney	0	1	2	1	0	0

Find the number of fish John caught on Wednesday.

Step 1: Go down the rows until you find John.

Step 2: Move across to the column marked "Wednesday"

Step 3: Read this value. (It will be across from John and down from Wednesday.)

John caught three fish on Wednesday.

III. Interpreting a line graph

A. Determine the value of each space on both the horizontal and vertical scales.

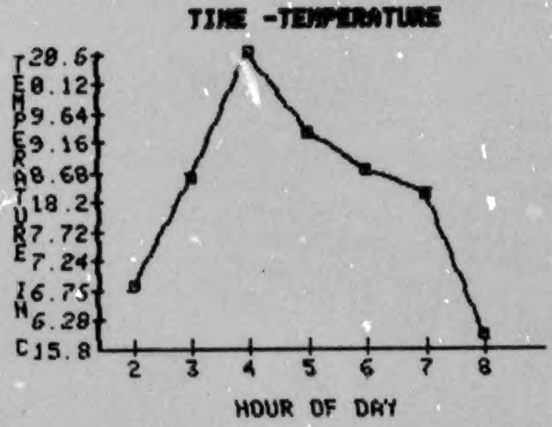
B. Locate the given value on the appropriate scale. This value may be on either the horizontal or vertical scale.

C. If the given value does not lie directly on a line of the scale, estimate its location and value.

D. After locating the given value, project up from a horizontal scale or across from a vertical scale to a point of the graph line.

E. From this point on the graph line, project across or down to the other scale. Read this value. Again, if the value is not directly on a line of this scale, you must estimate the value.

Example: The graph below shows the temperature in degrees Celsius for different times of the day.



Find the temperature at 3 PM.

Step 1: Locate 3 PM on the horizontal scale.

Step 2: Project up to an intersection with the line graph.

Step 3: From this point on the graph, project across to the vertical scale.

Step 4: Read this value.

The temperature is 18.2° Celsius at 3 PM.

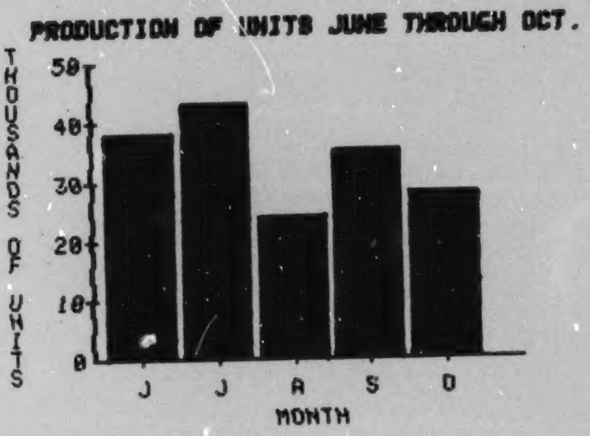
IV. Interpreting a bar graph

A. Determine the value of each space on the scale. (If the bars are horizontal look at the bottom scale. If the bars are vertical look at the scale on the left side.)

B. Locate the end of each bar. Project down for horizontal bars, across for vertical.

C. Read each value. If the end of a bar is not exactly on a line of the scale, estimate its value.

Example: This bar graph shows the monthly production of a manufacturing firm for the months of June-Oct.



Find the production for the month of August.

Step 1: Find August on the horizontal scale.

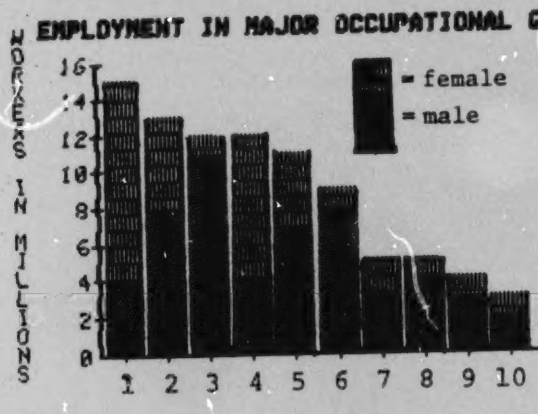
Step 2: Project up from August to the top of the bar.

Step 3: Project across to the vertical scale.

Step 4: Read this value.

The production for the month of August was 26,000 units.

D. Some bar graphs are constructed so that each bar represents more than one quantity. To distinguish one section from another, the sections are usually shaded or colored. Consult the legend for the symbols used.



1. Clerical
2. Professional and technical
3. Handwork
4. Car Repair
5. Operators
6. Managers and administraters
7. Sales
8. Non-farm laborers
9. Transport operatives
10. Farm workers

Example: The bar graph on the preceeding page shows United States employment in major occupational groups for the year 1980. Each group is represented by a bar. Each bar is divided into the number of males and females employed in that group.

V. Interpreting a circle graph

A. Determine what quantity the circle represents. Remember, a circle graph represents all of something.

B. Compare each sector of the graph to the whole. This will tell you what part each sector is of the whole. For example, if one sector is one-fourth of the circle, its value is 25% (or ¼) of the whole.

C. Multiply this part by the total amount the circle represents to get the value of the sector.

Example: The circle graph below shows how a traveling saleman spent his expense account.

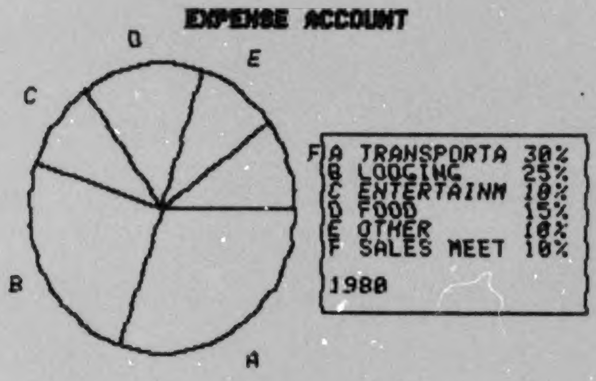
Find the amount he spent on lodging if his total account was $400.00.

Step 1: Locate the sector labeled lodging on the graph.

Step 2: Compare this sector to the whole circle. We find that it is 25%.

Step 3: Multiply 25% times $400.00.

He spent $100.00 on lodging.



VI. Interpreting a pictograph

A. Study the graph to become familiar with the symbol used and the vertical scale.

B. Determine the quantity which each symbol represents by consulting the legend.

C. Find the desired item on the vertical scale.

C. Count the number of symbols in this row and multiply by the value of each symbol.

(NOTE: If there is a part of a symbol represented, estimate its value.)

Example: The pictograph on the following page shows farm sales for a Turkey farm.

Find the number of eggs sold in 1973.

Step 1: Find 1973 on the vertical scale.

Step 2: Count the number of eggs in this row.

Step 3: Multiply this by 1,000 since the legend shows that one egg equals 1000 dozen eggs.

There were 7,000 dozen eggs sold that year.

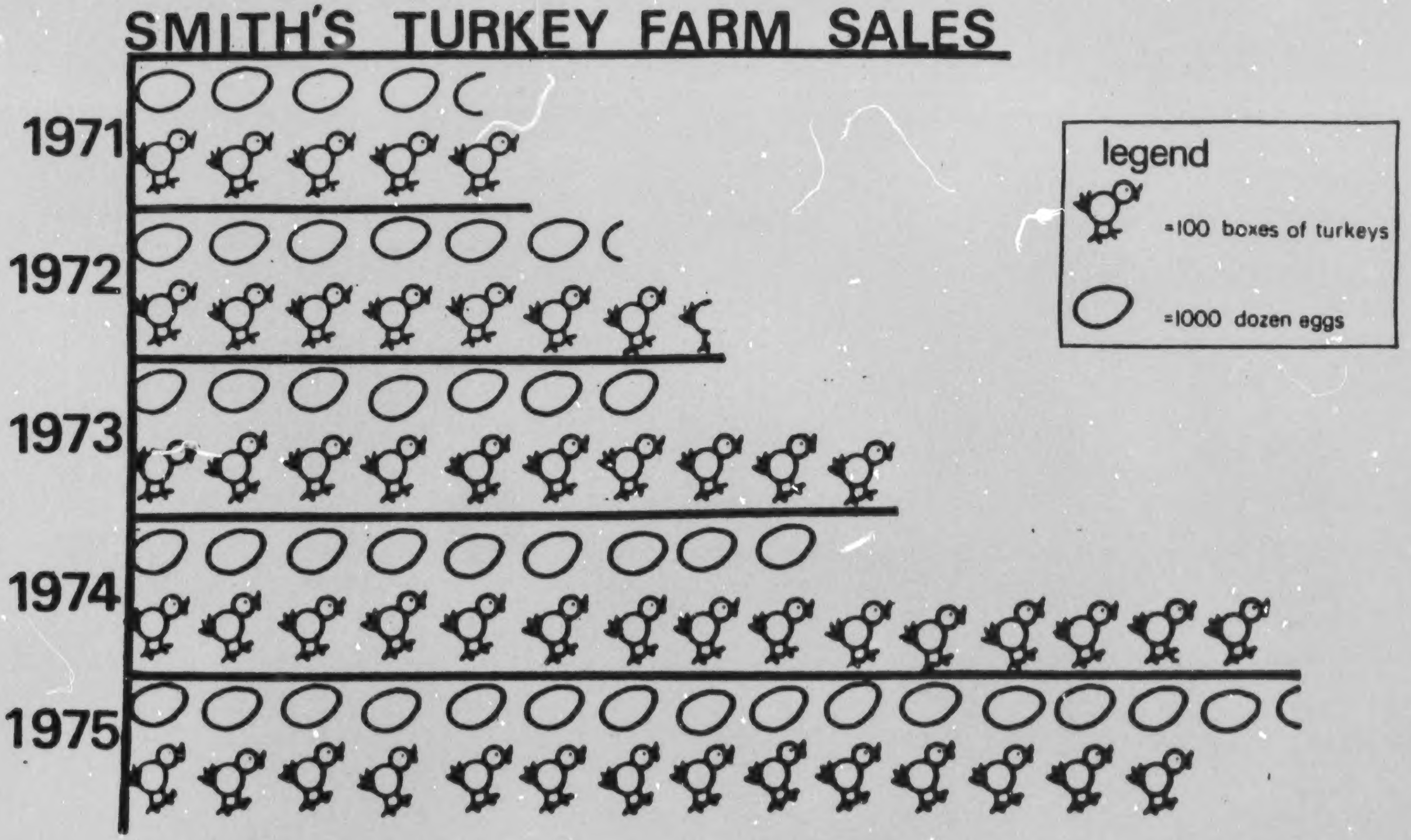

SMITH'S TURKEY FARM SALES
1971
1972
1973
1974
1975
legend
=100 boxes of turkeys
=1000 dozen eggs

TABLE AND GRAPH INTERPRETATION
UNIT I

ASSIGNMENT SHEET #1--INTERPRET A TABLE

Directions: Using the table below, answer the following questions.

	POPULATION (in millions)			PERCENTAGES	
COUNTRY	Total	City	Country	City	Country
S. Africa	21	10	11	48	52
Algiers	16	5	11	31	69
Israel	3	2	1	83	17
Japan	104	75	29	72	28
Spain	11	5	6	45	55
Canada	20	15	5	74	26
U.S.	203	149	54	74	26
Australia	13	11	2	86	14
Peru	6	2	4	33	67
U.S.S.R.	242	136	106	56	44

1. Which country has the greatest population?
2. Which country has the least population?
3. Which countries have total populations of less than 10 million?
4. Which country has the greatest percentage in country area?
5. Name the two countries which have the same percentage of people living in cities.
6. How many countries listed in the table have less than 60 percent of the population living in country areas?
7. Name the country which has a difference of 4% between the people living in city and country areas.
8. What is the difference in the number of people living in city and country areas in the United States.

9. What country has the smallest percentage of population in the city area?

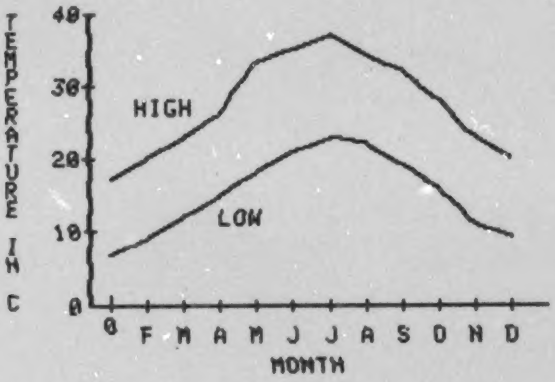
10. What country has the smallest percentage of population in country areas?

TABLE AND GRAPH INTERPRETATION
UNIT I

ASSIGNMENT SHEET #2--INTERPRET A LINE GRAPH

Directions: Using the line graph below, answer the following questions.

Monthly High vs. Low Temp in Acapulco

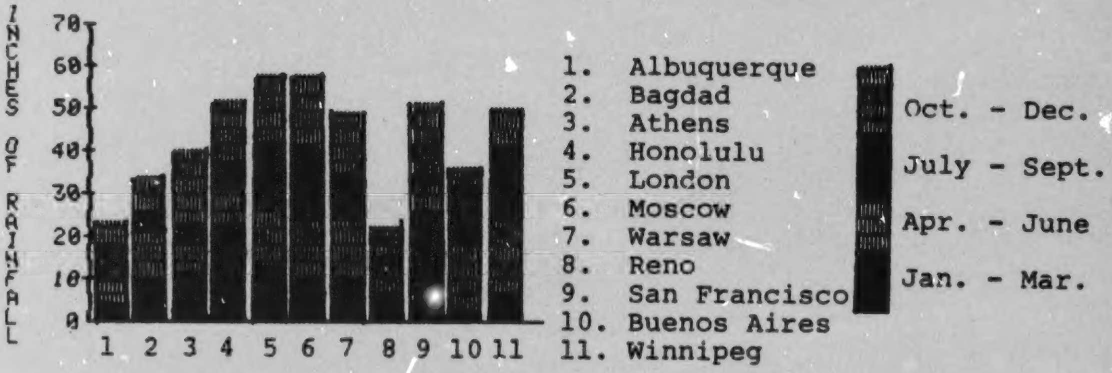


1. What do the two lines on the graph illustrate, according to the legend?
2. On what axis are the months of the year listed?
3. What is the possible range of the temperatures as indicated by the vertical axis?
4. What is the purpose of the legend?
5. What is the average low temperature in December?
6. What month has the lowest average high and low temperature?
7. What two months have the greatest difference in average high and low temperatures?

TABLE AND GRAPH INTERPRETATION
UNIT I

ASSIGNMENT SHEET #3--INTERPRET A BAR GRAPH

Directions: Using the bar graph below, answer the following question.



1. What does this graph illustrate?

2. Which months are the driest for all of these cities?

3. The city that gets the least rain during the year is?

4. Which four cities get the most rain during October, November and December?

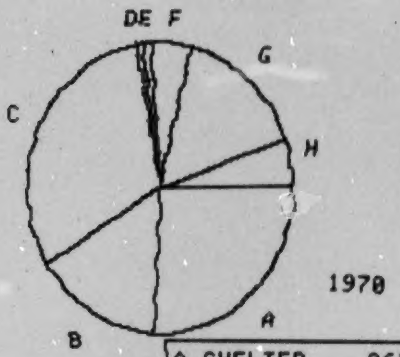
5. The legend explains that each part of the bar graph stands for ________ __________of the year.

6. Warsaw gets almost ______times as much rain as Reno.

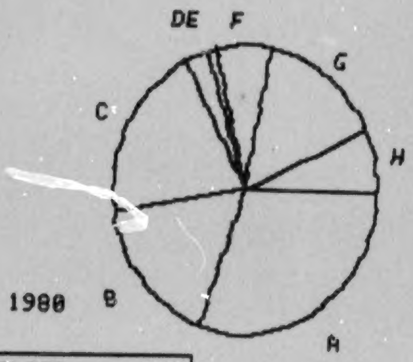
TABLE AND GRAPH INTERPRETATION
UNIT I

ASSIGNMENT SHEET #4--INTERPRET A CIRCLE GRAPH

Directions: Using the circle graphs below, answer the following questions.



A	SHELTER	26%
B	CLOTHING	15%
C	FOOD	31%
D	EDUCATION	1%
E	RELIGION	1%
F	RECREATION	5%
G	CAR EXPENS	15%
H	MEDICAL EX	5%
0		



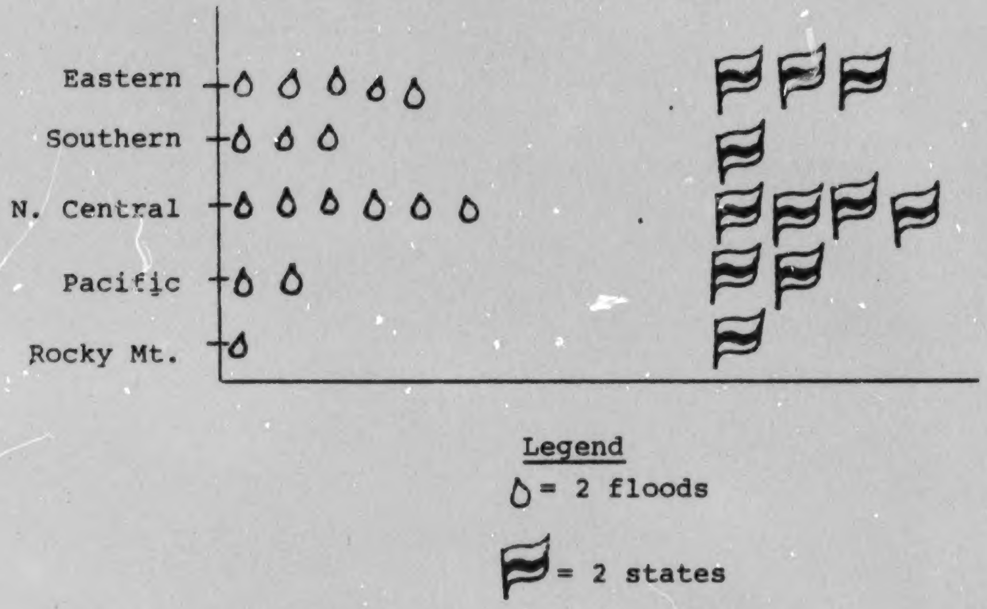
A	SHELTER	30%
B	CLOTHING	17%
C	FOOD	20%
D	EDUCATION	3%
E	RELIGION	1%
F	RECREATION	7%
G	CAR EXPENS	15%
H	MEDICAL	7%
0		

1. What do these two circle graphs illustrate?
2. On what did people spend the least part of their money in 1980?
3. What accounted for the greatest expenditure in 1980?
4. Did expenditure for food increase or decrease from 1970 to 1980?
5. What were the two largest expenditures in 1970?
6. Did medical expenses increase or decrease from 1970 to 1980?

TABLE AND GRAPH INTERPRETATION
UNIT I

ASSIGNMENT SHEET #5--INTERPRET A PICTOGRAPH

Flooding in the United States
in 1980



1. What is this pictograph about?
2. How many states does one flag represent?
3. How many floods does one drop of water represent?
4. Which region of the U.S. had the fewest floods?
5. Which region had the greatest number of states affected by flooding?
6. How may different regions of the U.S. are illustrated by the pictograph?

TABLE AND GRAPH INTERPRETATION
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. U.S.S.R.
2. Israel
3. Israel, Peru
4. Algiers
5. Canada, United States
6. 8
7. South Africa
8. 95 million
9. Algiers
10. Australia

ASSIGNMENT SHEET #2

1. High and low temperatures
2. horizontal axis
3. 0° to 40° celsius
4. It explains the meaning of the lines on the graph.
5. 10° C
6. January
7. February, July

ASSIGNMENT SHEET #3

1. The average yearly rainfall in inches for several cities.
2. January, February, March
3. Reno
4. Honolulu, London, Moscow, Warsaw
5. 3 months
6. 3

ASSIGNMENT SHEET #4

1. The graphs show how people spend their money during 1970 and 1980.
2. Religion
3. Shelter
4. It decreased
5. Food and Shelter
6. They increased

ASSIGNMENT SHEET #5

1. Flooding in the U.S.
2. 2 states
3. 2 floods
4. Rocky Mountain region
5. North Central
6. 5

TABLE AND GRAPH INTERPRETATION
UNIT I

TEST

1. Using the table below, answer the following questions. Use the blank provided at the end of each question for your answers.

   a. Which of the states in the table had the greatest amount of rainfall in the month of March?

   ____

   b. What was the average rainfall in Oklahoma for the month of April?

   ____

   c. What was the average rainfall in Arkansas for June?

   ____

   d. Which state had 9.2 inches of rainfall in the month of February?

   ____

   e. Which state had the greatest decrease in rainfall from May to June?

   ____

Average Rainfall in Texas, Oklahoma and Arkansas (in inches) for Jan.-June, 1982

STATES	MONTHS					
	JAN	FEB	MAR	APRIL	MAY	JUNE
Arkansas	10.5	11.8	12.0	13.5	10.2	8.0
Oklahoma	11.5	10.6	9.2	10.6	8.2	6.2
Texas	8.0	9.2	8.2	9.3	7.6	4.0

2. Use the line graph below to answer the following questions. Use the space provided for your answers.

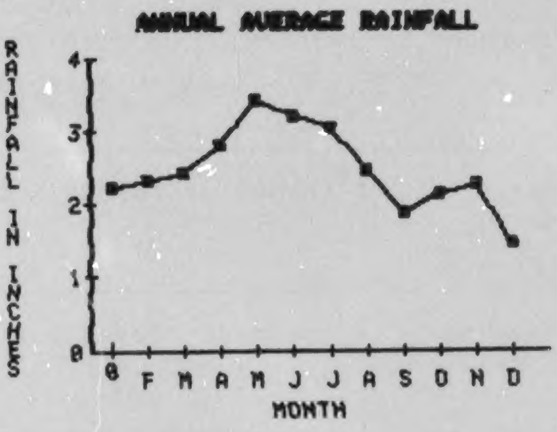
   a. What month had the greatest average rainfall of the year?

   b. What was the average rainfall for the month of June?

   c. What month had the lowest average rainfall of the year?

   d. What was the average rainfall for the month of March?

   e. What month showed the greatest decline in rainfall over the previous month?



3. Using the bar graph on the next page, answer the following questions. Use the space provided for your answers.

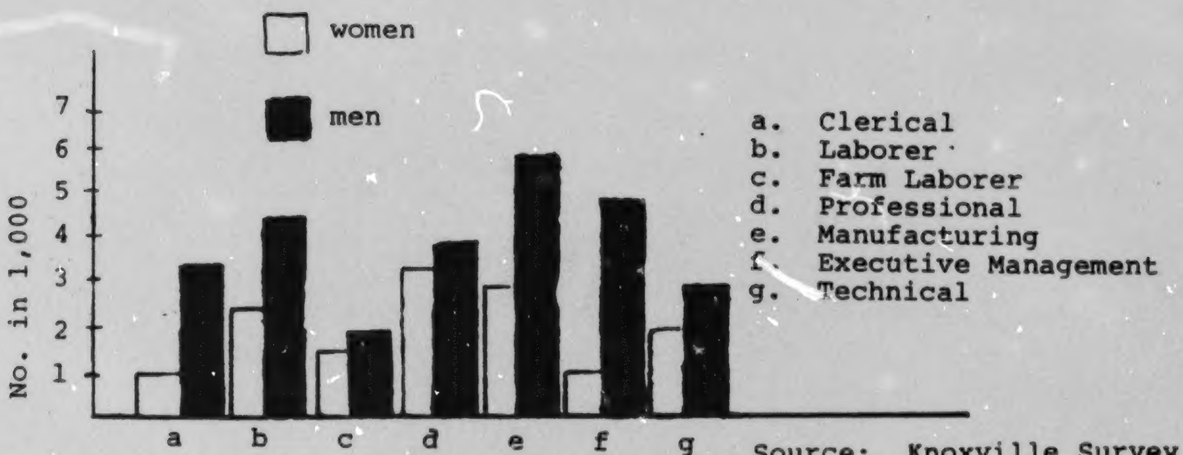
   a. What area of employment had the greatest difference in number of men and women?

   b. How many women were employed as farm laborers?

   c How may men were in the clerical field?

   d. How many more men than women professionals are there?

   e. What was the source of this material?



Source: Knoxville Survey

4. Use the circle graph below to answer the following questions. Use the space provided for your answers.

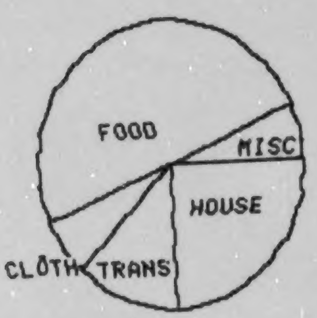
   a. How much of the monthly budget is spent for food?

   b. What percentage of the budget is spent on lodging?

   c. What 2 items are budgeted about equally?

   d. About how much is spent by this family for clothing?

   e. About how much more is spent for lodging than clothing?



5. Using the pictograph below, answer the following questions. Use the space provided for your answers.

   a. What age group spends the most on entertainment?

   b. How much does the 10-15 year group spend?

   c. What age group shows the greatest increase in expenditures over the previous group?

   d. How much does each symbol represent?

   e. How much does the over-50 group spend?

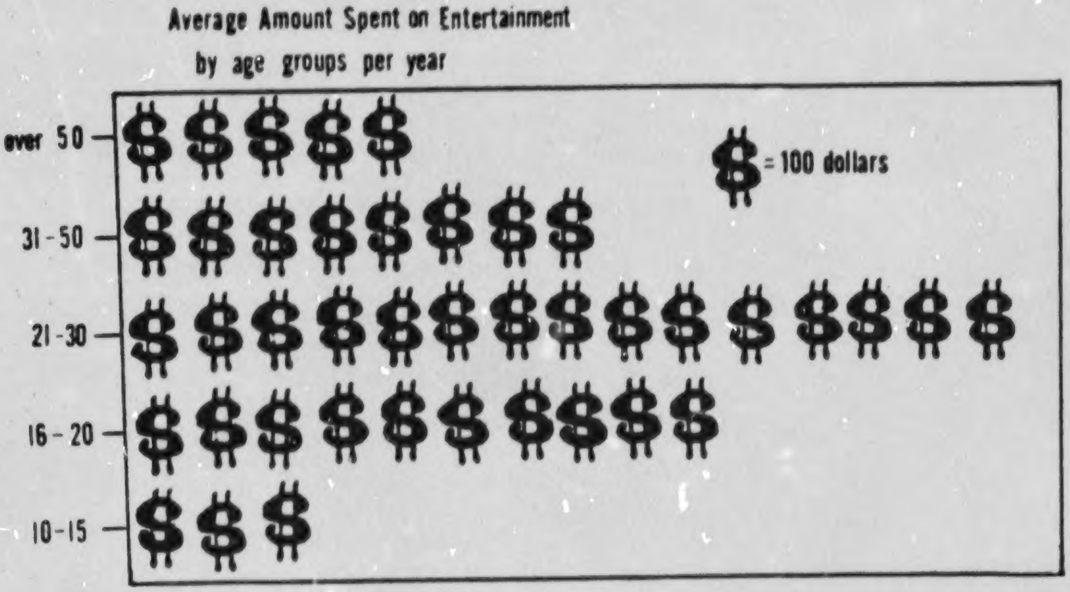


TABLE AND GRAPH INTERPRETATION
UNIT I

ANSWERS TO TEST

1. a. Arkansas
   b. 10.6
   c. 8.0
   d. Texas
   e. Texas
2. a. May
   b. 3.2
   c. December
   d. 2.5
   e. December
3. a. executive, managers
   b. 1500
   c. 3500
   d. 500
   e. the Knoxville Survey
4. a. 400%
   b. 25%
   c. utilities and msc.
   d. 100%
   e. 100%
5. a. 21-30
   b. 300
   c. 16-20
   d. $100
   e. 500

TABLE AND GRAPH CONSTRUCTION
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to construct tables and graphs. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Illustrate given data by a table.
2. Illustrate given data by a line graph.
3. Illustrate given data by a bar graph.
4. Illustrate given data by a circle graph.
5. Illustrate given data by a pictograph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

SUGGESTED ACTIVITIES

I. Make transparencies.

II. Provide student with objective sheets.

III. Provide student with information and assignment sheets.

IV. Discuss unit and specific objectives.

V. Discuss information and assignment sheets.

VI. Illustrate the construction of a table and various graphs with transparencies.

VII. Assist students as they work through assignment sheets.

VIII. Give test.

IX. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Transparency masters--DATA, TABLE, AND GRAPHS

  D. Assignment Sheets

    1. Assignment Sheet #1--Construct a Table
    2. Assignment Sheet #2--Construct a Line Graph
    3. Assignment Sheet #3--Construct a Bar Graph
    4. Assignment Sheet #4--Construct a Circle Graph
    5. Assignment Sheet #5--Construct a Pictograph

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References

A. Shea, James T. Basic Essentials of Math, Part II, 2nd ed. Austin, TX 78768: Steck-Vaughn Co., 1980.

The following Data can be organized into a table.

The U.S. produced 350 billion barrels of oil in 1960, 450 billion barrels in 1970, 475 billion barrels in 1975, and 525 billion barrels in 1980.

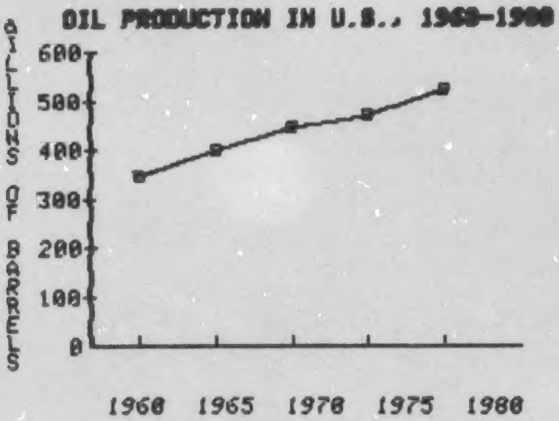
Oil Production in U. S., 1960-1980 ---Title

------column headings

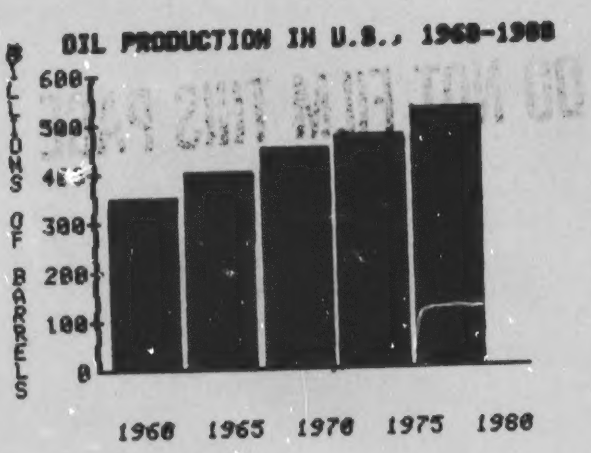
row--

YEAR	PRODUCTION
1960	350,000,000,000
1965	400,000,000,000
1970	450,000,000,000
1975	475,000,000,000
1980	525,000,000,000

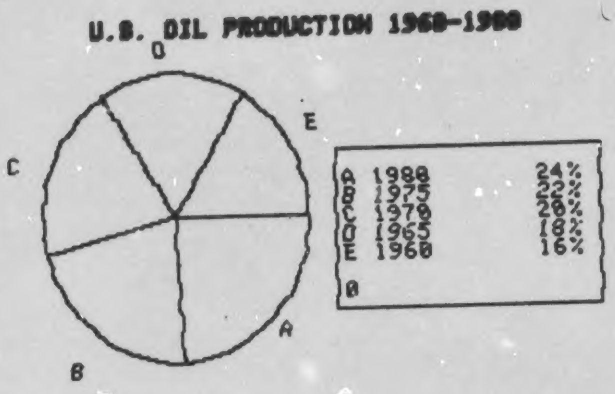
The same data can be used to construct a line graph.



This same data can be used to construct a bar graph.



This same data can be used to construct a circle graph.



This same data can be used to construct a pictograph.

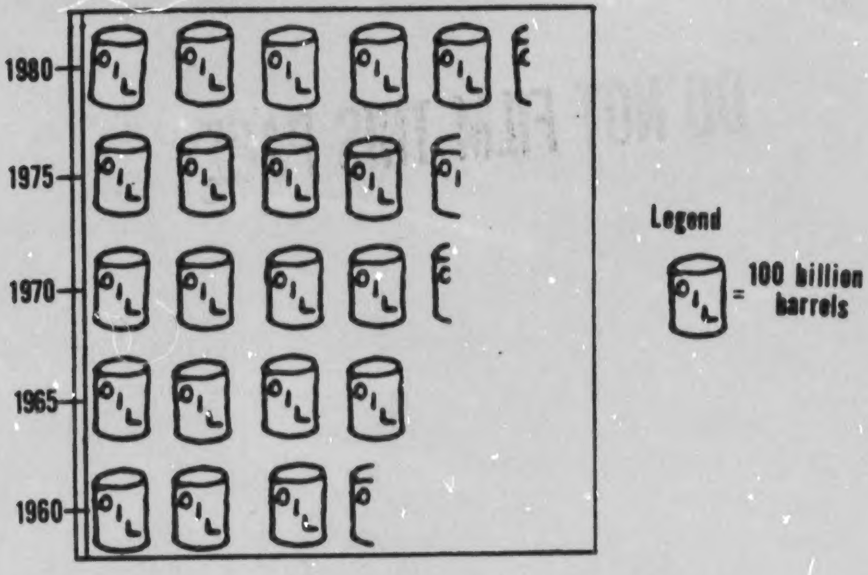


TABLE AND GRAPH CONSTRUCTION
UNIT II

INFORMATION SHEET

I. Making a Table

A. Organize the data into rows and columns. Use some method (small to large, low to high, most recent to oldest, etc) of organization.

Example: The following data should be organized in ascending or descending order of the years.

Data: In 1978 there were 42 deaths due to rabies; in 1980, 36 deaths due to rabies; in 1979, 35 deaths due to rabies; in 1977, 40 deaths due to rabies.

Deaths Due to Rabies

YEAR	DEATHS
1977	40
1978	42
1979	35
1980	36

II. Making a line graph

A. Draw a rectangle the size needed to represent the data. (Use graph paper if is is available.)

B. Determine the scale to be used. (You must do this for the horizontal and vertical scales.) The units on the scales must be equally spaced and represent the same quantity.

C. Decide which scales are to be used for which data. Explain or identify the scales.

D. Transfer your data on to the graph. Locate points of data on the scales and then connect these points with straight lines.

E. Title your graph.

Example: Use the data in the following table to construct a line graph.

Rainfall Last Week

DAY	RAINFALL
Monday	3.5
Tuesday	1.5
Wednesday	0.0
Thursday	2.6
Friday	1.7

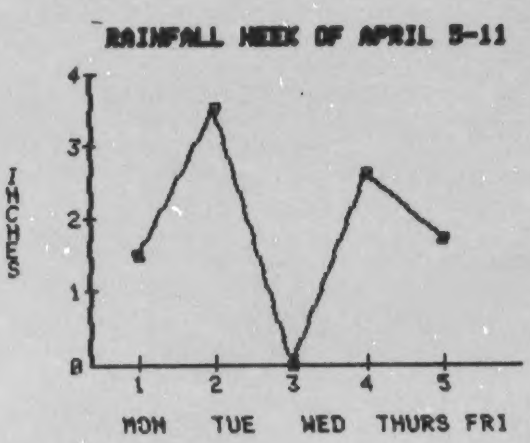
Step 1: Draw a rectangle.

Step 2: Decide on the scales.

Step 3: Label scales.

Step 4: Transfer the data to graph and connect the dots.

Step 5: Title your graph.



III. Making a Bar Graph

A. Decide whether to make a horizontal or vertical bar graph. (Horizontal bar graphs are usually easier to read.)

B. Decide which scale should be vertical and which should be horizontal. (It is customary that time is placed on the horizontal scale and values on the vertical.)

C. Round off your values to the nearest half-value to make the bars easier to read.

D. Draw a rectangle and label the scales.

E. Along the base for vertical bars and on the side for horizontal bars, mark off where each bar will go. Extend the bar out till the top or edge of the bar is even with its value on the value scale.

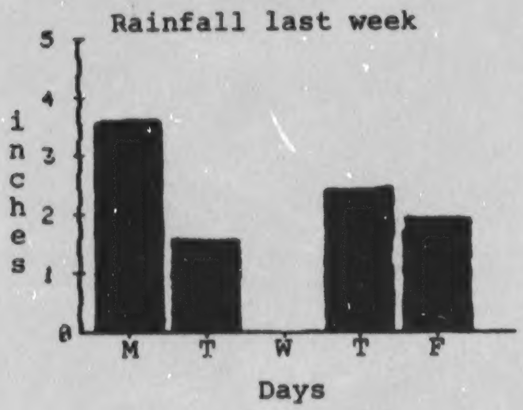
F. Fill in the bar with the pattern you have chosen to represent your data. (Most bar graphs have the bars completely blacked in to make the graph easy to read and understand.)

G. Title your graph.

Example: Make a bar graph from the following table.

DAY	RAINFALL
Monday	3.5
Tuesday	1.5
Wednesday	0.0
Thursday	2.6
Friday	1.7

Step 1: Choose horizontal or vertical bars.
Step 2: Decide which scale should be vertical and which should be horizontal.
Step 3: Round off your values.
Step 4: Draw a rectangle and label the scales.
Step 5: Mark the position of the bars.
Step 6: Fill in the bars with chosen pattern.
Step 7: Title your graph.



IV. Making a circle graph

A. Compute the percents. To find the percent of each part, divide the part by the whole amount.

B. Compute the degree measurements. Multiply the percent times 360° (degrees in a circle)

(NOTE: The total degrees must add up to 360°.)

C. Draw a circle the size desired.

D. Measure and mark the number of degrees each part represents.

E. Label each sector.

F. Title the graph.

Example: Make a circle graph from the following table.

ITEM	COST
Housing	$200
Trans.	$100
Clothing	$ 50
Food	$400
Misc.	$ 50

A family budget of $800 was spent in the ways shown in the table above.

Step 1: Find each percent.

Housing $\frac{\$200}{\$800} = \frac{1}{4} = 25\%$

Transportation $\frac{100}{800} = \frac{1}{8} = 12.5\%$

Clothing $\frac{50}{800} = \frac{1}{16} = 6.25\%$

Food $\frac{400}{800} = \frac{1}{2} = 50\%$

Misc. $\frac{50}{800} = \frac{1}{16} = 6.25\%$

Step 2: Compute the degrees in each sector.

Housing $.25 \times 360^{\circ} = 90^{\circ}$

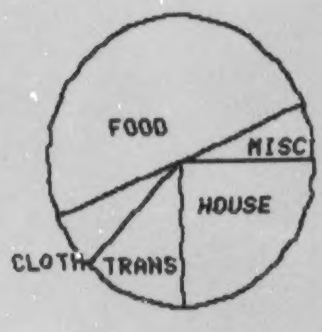
Transportation $.125 \times 360^{\circ} = 45^{\circ}$

Clothing $.062 \times 360^{\circ} = 22.5^{\circ}$

Food $.50 \times 360^{\circ} = 50^{\circ}$

Misc $.062 \times 360^{\circ} = 22.5^{0}$

Step 3: Draw a circle and mark the sectors.



The Family Budget

(NOTE: A protractor will be needed if the degrees are not easily drawn.)

V. Making a Pictograph

A. Decide on a symbol and how much each symbol will represent.

B. Draw a rectangle.

C. Label the vertical scale (a pictograph only has one scale, usually it is vertical.).

D. Consult your table and draw the correct number of symbols for each item on the scale.

E. Make a legend.

F. Title your graph.

Exapmle: Make a pictograph from the following table.

Population of Dallas, Texas for
1950,1960,1970, and 1980

YEAR	POPULATION
1950	750,000
1960	1,000,000
1970	1,500,000
1980	2,000,000

A. Pick your symbol.

B. Draw a rectangle.

C. Label the vertical scale.

D. Make a legend.

E. Title your pictograph.

NOTE: If a whole symbol is not needed, draw the appropriate part.

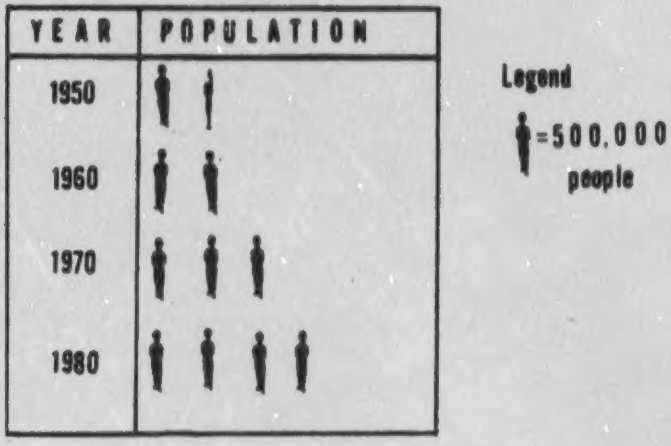


TABLE AND GRAPH CONSTRUCTION
UNIT II

ASSIGNMENT SHEET #1--CONSTRUCT A TABLE

Directions: Organize the data given below into a table. Your table must include a title, a column heading, and column subheadings.

Data: Mr. and Mrs. Jones and son, Tom, spent a week on vacation at Lake Juneau. They spent Monday fishing. Dad caught 5, Mom and Tom caught 10 fish each. Tuesday Dad caught 7, Mom caught 10 and Tom caught 20 fish. Wednesday, Dad and Mom caught 5 each and Tom caught 8. Thursday Dad caught 3, Mom caught 10 and Tom caught 5. Friday, Dad caught 0, Mom caught 5 and Tom caught 17 fish.

Notes: On your graph, show individual totals, daily totals, and a trip total.

TABLE AND GRAPH CONSTRUCTION
UNIT II

ASSIGNMENT SHEET #2--CONSTRUCT A LINE GRAPH

Directions: Using the Data given on Assignment sheet #1, draw a line graph. Put number of fish on the vertical scale and the days on the horizontal scale. Make a legend and use a different line for each member of the family. Use the space below for your graph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

ASSIGNMENT SHEET #3--CONSTRUCT A BAR GRAPH

Directions: Using the data given on Assignment sheet #1, draw a bar graph. You may use horizontal or vertical bars. Make a legend. Use the space below for your graph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

ASSIGNMENT SHEET #4--CONSTRUCT A CIRCLE GRAPH

Directions: Using the data given on Assignment sheet #1, make a circle graph. Remember, a circle graph represents all of something. Use the trip total as the whole, and the individual totals as parts. Use the space below for your graph. Be sure to label your sectors.

TABLE AND GRAPH CONSTRUCTION
UNIT II

ASSIGNMENT SHEET #5--CONSTRUCT A PICTOGRAPH

Directions: Using the data given in Assignment sheet #1, make a pictograph. Use a fish as the symbol and let one represent five. Put the names of the family memebers on the vertical axis. Use the space below for your graph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

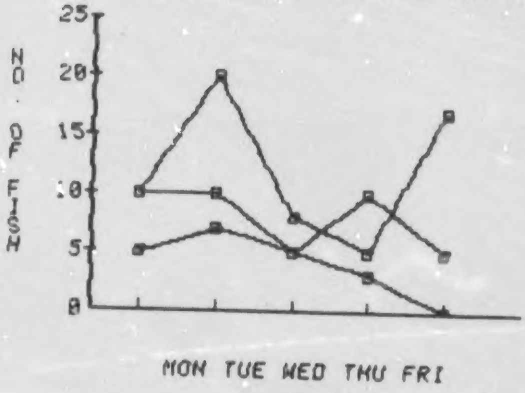
ASSIGNMENT SHEET #1

The Jones Family Vacation

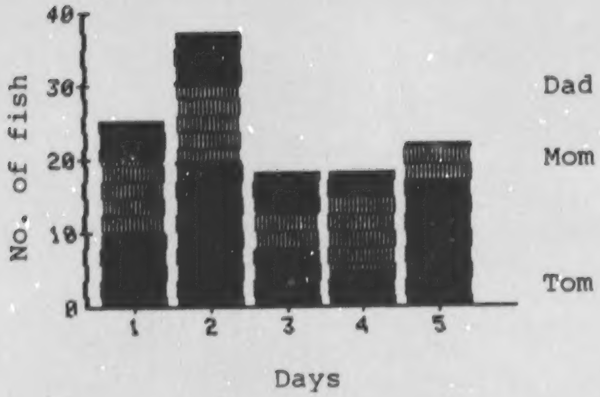
DAYS OF THE WEEK	NO. OF FISH CAUGHT BY FAMILY MEMBERS			
	Dad	Mom	Tom	Total for Day
Monday	5	10	10	25
Tuesday	7	10	20	37
Wednsday	5	5	8	18
Thursday	3	10	5	18
Friday	0	5	17	22
Family Member Totals	20	40	60	120

ASSIGNMENT SHEET #2

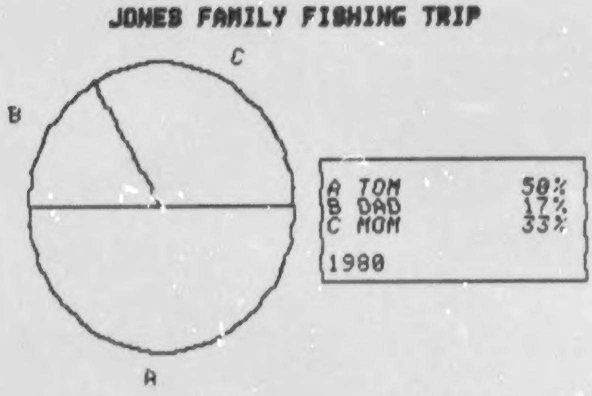
JONES FAMILY FISHING TRIP



ASSIGNMENT SHEET #3



ASSIGNMENT SHEET #4



ASSIGNMENT SHEET #5

Jones Family Fishing Trip

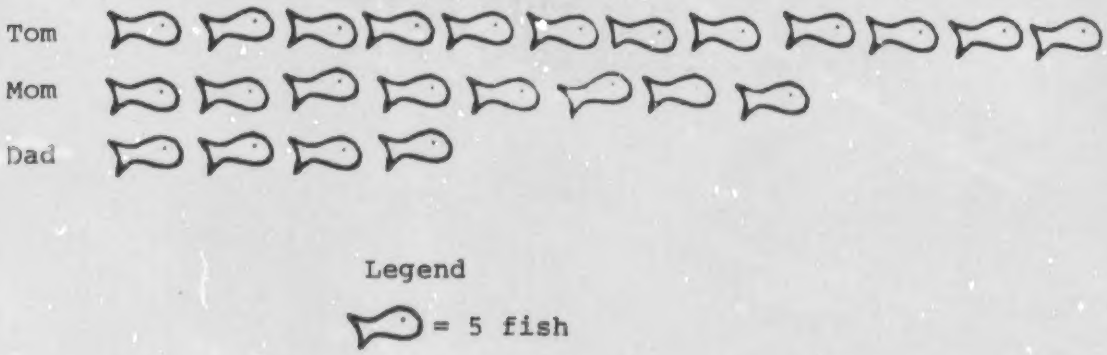


TABLE AND GRAPH CONSTRUCTION
UNIT II

TEST

1. Using the data below, construct a table.

Data: In 1982 there were 110,000 job openings in the category of Protective Services. Of this number, 70,000 were for guards, 15,000 were for police officers, 12,000 were for correction officers, 7,000 for fire fighters and 6,000 were for government inspectors.

Use the space below for your table:

2. Using the table you prepared in question one, construct a line graph. Use the space below for your graph.

3. Using the table in number 1, prepare a bar graph. Use the space below for your graph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

TEST

1. Using the data below, construct a table.

   Data: In 1982 there were 110,000 job openings in the category of Protective Services. Of this number, 70,000 were for guards, 15,000 were for police officers, 12,000 were for correction officers, 7,000 for fire fighters and 6,000 were for government inspectors.

   Use the space below for your table:

2. Using the table you prepared in question one, construct a line graph. Use the space below for your graph.

3. Using the table in number 1, prepare a bar graph. Use the space below for your graph.

4. a. Using the data given below, prepare another table.

Data: A car dealership has 4 salesmen. Mr. Jones sold 12 cars in May, 6 cars in June, and 7 cars in July. Mr. Smith sold 9 cars in May, 5 cars in June and 6 cars in July. Mr. Brown sold 10 cars in May, 11 cars in June and 4 cars in July. Ms. Green sold 11 cars in May, 12 cars in June and 7 cars in July.

Use the space below for your graph.

b. Using the table you prepared in 4a, make a circle graph. Use the space below for your graph.

5. Using the table from 4a, prepare a pictograph. Use the space below for your graph.

TABLE AND GRAPH CONSTRUCTION
UNIT II

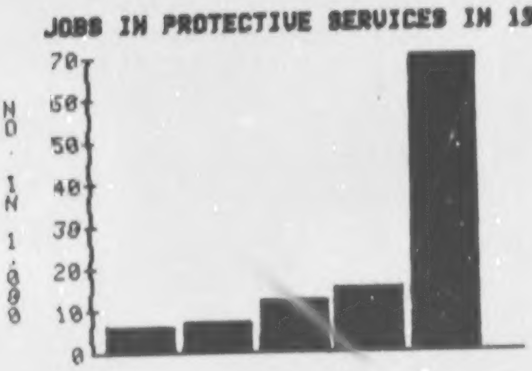
ANSWERS TO TEST

1.

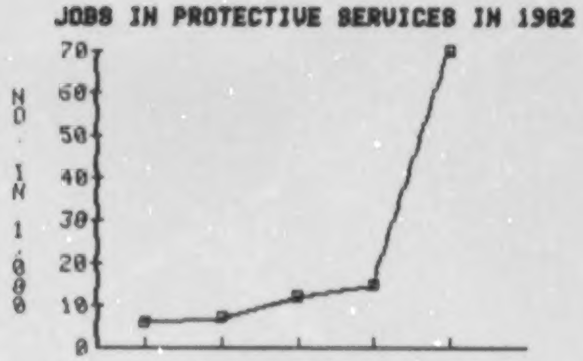
Jobs in Protective Services in 1982

JOBS	NUMBER OF OPENINGS
Government Inspectors	6,000
Fire Fighters	7,000
Correstion Officers	12,000
Police Officers	15,000
Guards	70,000

2.


JOBS IN PROTECTIVE SERVICES IN 1982

3.



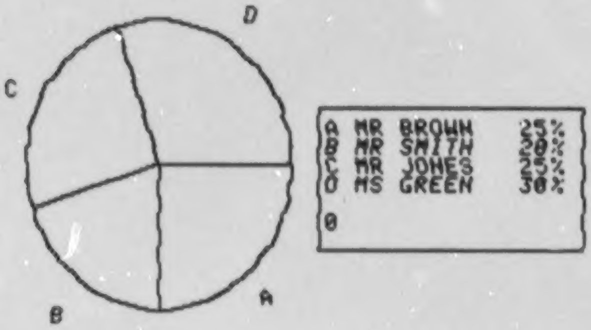
4. a.

Cars Sold May-July

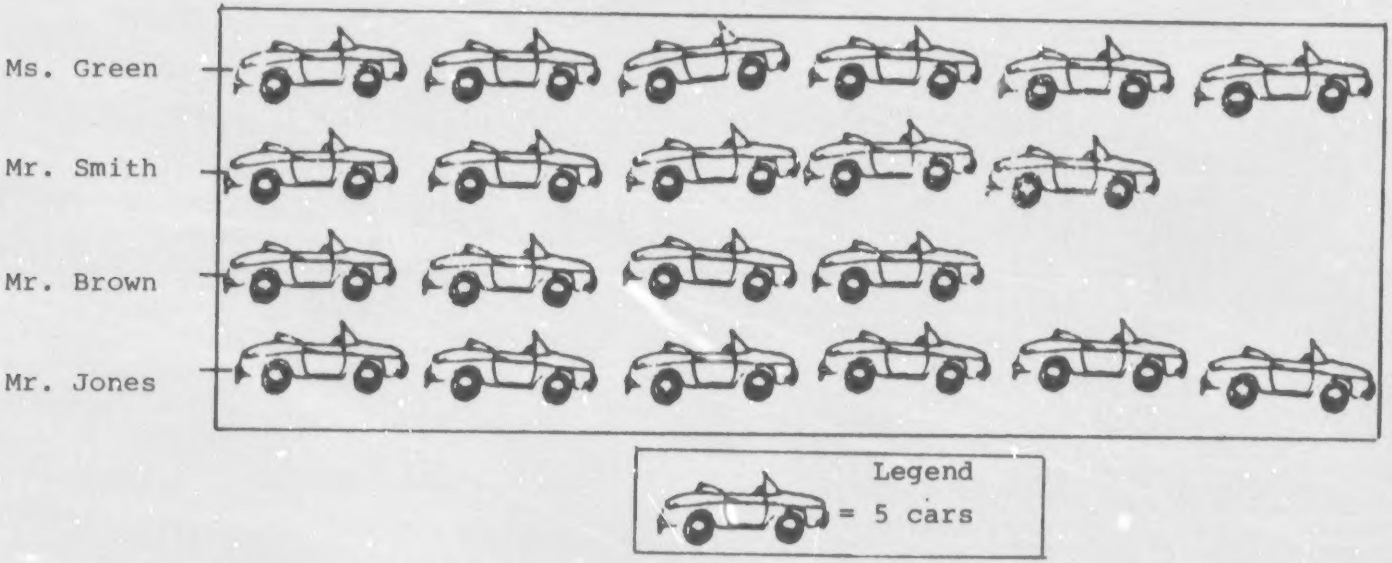
SALESMAN NAME	MONTH		
	May	June	July
Mr. Jones	12	6	7
Mr. Smith	9	5	6
Mr. Brown	10	11	4
Ms. Green	11	12	7

4. b.

CARS SOLD MAY THRU JUNE



5.



CENTRAL TENDENCIES

UNIT III

UNIT OBJECTIVE

After completion of this unit, the student should be able to determine central tendencies in given data. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Determine the mean of given data.
2. Determine the median of given data.
3. Determine the mode of given data.

CENTRAL TENDENCIES
UNIT III

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets.

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets-

    1. Assignment Sheet #1--Determining the Mean.

    2. Assignment Sheet #2--Determining the Median.

    3. Assignment Sheet #3--Determining the Mode.

  D. Answers to Assignment Sheets

  E. Test

  F. Answers to test

II. References

  A. Hopkins, Kenneth D. and Gene V. Glass. Basic Statistics for the Behavioral Sciences. Englewood, NJ: Prentice-Hall Inc., 1978.

  B. Smith, Robert D. Vocational-Technical Mathematics Albany, NY: Delmar Publishers Incorportated, 1983.

CENTRAL TENDENCIES

UNIT III

INFORMATION SHEET

I. Terms and Definitions

A. Measures of Central Tendencies--Mean, median and mode; measures used in interpreting or describing a set of observations (data); measures of "average" groupings

B. Mean--The sum of a set of observations (data); the most commonly used measure of central tendency

C. Median--The 50th percentile of a distribution (grouping of numbers); the point below which half of the observations fall; the second most frequently used measure of central tendency

D. Mode--The most frequently occurring observation; the most popular score or class of scores; the least reliable measure of central tendency

II. Procedures

A. Determining the mean--Find the sum of the observations; then divide the sum by the number of observations.

Example: If 3 workers are 40, 45, and 65 years old, the mean age of the workers is 50.

$40 + 45 + 65 = 150/3 = 50$

B. Determining the median--Find the observation at which half of the observations fall above and half of the observations fall below.

(NOTE: The following formula is helpful in determining the median--$(n + 1) / 2$, where $n =$ the number of observations.)

Example: If the temperature registers the following degrees in a week: 90, 98, 105, 106, 111, 112, and 113, the median temperature is 106.

(NOTE: When n is an even number, the median will fall halfway between the middlemost pair of numbers.)

Example: In the above temperature example, if the highest temperature (113) was omitted, the middlemost pair of scores would be 105 and 106. In this case, to determine the median, add the middlemost pair of scores and divide them by 2.)

Example: 105 + 106 / 2 = 105.5

C. Determining the mode--Examine the observed scores and count the numbers of times each score occurs. The score which occurs most often is the mode.

Example: If 5 cars get the following gasoline mileage--30.4, 31.6, 33.4, 30.4, and 28.4 MPG, the mode is 30.4 because it it the most frequently occurring observation.

CENTRAL TENDENCIES
UNIT III

ASSIGNMENT SHEET #1--DETERMINING THE MEAN

1. Directions: Find the mean in the following problems.

A. If the salaries for three auto mechanics were $11,000, $15,000 and $22,000, what would their mean salary be?

B. Students in a math class scored the following on a unit test: 98, 67, 88, 45, 99, 32, 55, 16, 78, and 89. What was the mean score for the test?

C. If the temperature during a 5 day period was 99, 98, 93, 92, and 90, what was the mean temperature during that week?

D. A technician took the following times to produce her quota during an eight hour shift: 45, 56, 56, 43, 57, 60 and 54 minutes. What was the mean time it took her to produce her quota during that day?

E. A typist made the following errors when writing four letters:

Letter #1	4 errors
Letter #2	3 errors
Letter #3	1 error
Letter #4	4 errors

CENTRAL TENDENCIES
UNIT III

ASSIGNMENT SHEET #2--DETERMINING THE MEDIAN

Directions: Find the median in the following problems.

a. The following table illustrates the output of automobiles for a seven-year period. What was the median year for auto production?

YEAR	AUTOMOBILES
1970	7,319,000
1971	8,053,000
1972	8,261,000
1973	9,894,000
1974	9,934,000
1975	9,998,000
1976	10,469,000

b. What was the median high temperature if the thermometer registered consecutive highs of 91, 89, 111, and 97 degrees?

c. A person's living expenses for a five-year period were $5,570, $6,960, $5,590, $7,900, and $6,670. What was the median expense?

CENTRAL TENDENCIES
UNIT III

ASSIGNMENT SHEET #3--DETERMINE THE MODE

Directions: Find the mode in the following problems.

a. A business suffered the following losses during a six-year period. What was the mode of the losses?

YEAR	MILLIONS OF $
1st Year	500
2nd Year	700
3rd Year	450
4th Year	550
5th Year	550
6th Year	375

b. The current loads used by an electric appliance varied as follows:

37,500 amperes
37,000 amperes
10,500 amperes
28,000 amperes
75,000 amperes
28,500 amperes
48,000 amperes

Determine the mode of amperes used.

c. The rainfall registered during a six-month period was as follows: 2.03, 2.30, 1.30, 4.0, 2.30, and 3.20 inches. What was the mode of rainfall?

CENTRAL TENDENCIES
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

a. $16,000
b. 66.7
c. 94.4
d. 53
e. 3

ASSIGNMENT SHEET #2

a. 1973
b. 94 degrees
c. 6670

ASSIGNMENT SHEET #3

a. 550
b. 28,000
c. 2.3

CENTRAL TENDENCIES
UNIT III

TEST

Directions: Using the table below, answer the following questions.

YEAR	BIRTHS (Millions of People)
1945	2.74
1950	3.55
1955	4.05
1960	4.26
1965	2.74

a. What is the mean number of births?

b. What is the median number of births?

c. What is the mode for the number of births?

CENTRAL TENDENCIES
UNIT III

ANSWERS TO TEST

a. 3.47 million

b. 3.55 million

c. 2.74 million

BEGINNING CALCULATORS
UNIT I

UNIT OBJECTIVE

After completion of this unit, the student should be able to solve problems using a calculator. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Add whole numbers and decimals with a calculator.
2. Subtract whole numbers and decimals with a calculator.
3. Multiply whole numbers and decimals with a calculator.
4. Divide whole numbers and decimals with a calculator.

BEGINNING CALCULATORS
UNIT I

SUGGESTED ACTIVITIES

I. Provide student with objective sheet

II. Provide student with information and assignment sheets

III. Discuss unit and specific objectives

IV. Discuss information and assignment sheets

V. Assist students as they work through assignment sheets

VI. Give test

VII. Evaluate and record test results

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets

    1. Assignment Sheet #1--Add whole numbers and decimals with a calculator.

    2. Assignment Sheet #2--Subtract whole numbers and decimals with a calculator.

    3. Assignment Sheet #3--Multiply whole numbers and decimals with a calculator.

    4. Assignment Sheet #4--Divide whole numbers and decimals with a calculator.

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

A. BAJPAI, AVI C., Rodney M. Bond and Jerry W. Jones. Applied Math. NY: Packard Publishing, 1983

BEGINNING CALCULATORS
UNIT I

INFORMATION SHEET

I. Addition of whole numbers and decimals

A. Enter the first number.

B. Press the $\boxed{+}$ key.

C. Enter the second number.

D. Repeat A and B until all numbers being added have been entered. Omit step B after the last number has been entered.

E. Press the $\boxed{=}$ key.

F. The answer will be displayed.

Example:

$$\begin{array}{r} 25 \\ +76 \\ \hline 101 \end{array} \qquad \begin{array}{l} \boxed{2}\ \boxed{5}\ \boxed{+} \\ \boxed{7}\ \boxed{6}\ \boxed{=} \end{array}$$

Display
101

$$\begin{array}{r} 12.4 \\ +\ 3.8 \\ \hline 16.2 \end{array} \qquad \begin{array}{l} \boxed{1}\ \boxed{2}\ \boxed{.}\ \boxed{4}\ \boxed{+} \\ \boxed{3}\ \boxed{.}\ \boxed{8}\ \boxed{=} \end{array}$$

Display
16.2

II. Subtraction of whole numbers and decimals

A. Enter the first number.

B. Press the $\boxed{-}$ key.

C. Enter the second number.

D. Press the $\boxed{=}$ key.

E. The answer will be displayed.

Example:

$$\begin{array}{r} 462 \\ -\ 94 \\ \hline 368 \end{array} \qquad \begin{array}{l} \boxed{4}\ \boxed{6}\ \boxed{2}\ \boxed{-} \\ \boxed{9}\ \boxed{4}\ \boxed{=} \end{array}$$

Display
368

$$\begin{array}{r} 948.62 \\ -\ 3.07 \\ \hline 945.55 \end{array}$$

$\boxed{9}\ \boxed{4}\ \boxed{8}\ \boxed{.}\ \boxed{6}\ \boxed{2}\ \boxed{-}$
$\boxed{3}\ \boxed{.}\ \boxed{0}\ \boxed{7}\ \boxed{=}$

Display
945.55

III. Multiplication of whole numbers and decimals

A. Enter the first number.

B. Press the $\boxed{x}$ key.

C. Repeat steps A and B until all the numbers to be multiplied together have been entered.

(NOTE: Step B is left off after the last number.)

D. Press the $\boxed{=}$ key.

E. The answer will be displayed.

Example: 45 x 16 x 4 = 2880

$\boxed{4}\ \boxed{5}\ \boxed{x}\ \boxed{1}\ \boxed{6}\ \boxed{x}\ \boxed{4}\ \boxed{=}$

Display
2880

$$\begin{array}{r} 22.8 \\ \times\ 9.4 \\ \hline 210.56 \end{array}$$

$\boxed{2}\ \boxed{2}\ \boxed{.}\ \boxed{8}\ \boxed{x}$
$\boxed{9}\ \boxed{.}\ \boxed{4}\ \boxed{=}$

Display
210.56

IV. Division of whole numbers and decimals.

A. Enter the first number.

B. Press the $\boxed{\div}$ key.

C. Enter the second number (divisor).

D. Press the $\boxed{=}$ key.

E. The answer (quotient) will be displayed.

Example: 497 ÷ 7 = 71

$\boxed{4}\ \boxed{9}\ \boxed{7}\ \boxed{\div}\ \boxed{7}\ \boxed{=}$

Display
71

$$\frac{948.6}{3.21}$$

$\boxed{9}\ \boxed{4}\ \boxed{8}\ \boxed{.}\ \boxed{6}\ \boxed{\div}$
$\boxed{3}\ \boxed{.}\ \boxed{2}\ \boxed{1}\ \boxed{=}$

Display
295.5140

rounded to
295.51

(NOTE: Remember that the fraction bar means division.)

BEGINNING CALCULATORS
UNIT I

ASSIGNMENT SHEET #1--ADD WHOLE NUMBERS AND DECIMALS

Directions: Work the following problems with a calculator. Round your answers to the nearest hundredth.

Example:

$$\begin{array}{r} 22.96 \\ 13.023 \\ 14.67 \\ \underline{+\ 9.10} \\ 59.75 \end{array}$$

$$\boxed{2}\ \boxed{2}\ \boxed{.}\ \boxed{9}\ \boxed{6}\ \boxed{+}$$
$$\boxed{1}\ \boxed{3}\ \boxed{.}\ \boxed{0}\ \boxed{2}\ \boxed{3}\ \boxed{+}$$
$$\boxed{1}\ \boxed{4}\ \boxed{.}\ \boxed{6}\ \boxed{7}\ \boxed{+}$$
$$\boxed{9}\ \boxed{.}\ \boxed{1}\ \boxed{0}\ \boxed{=}$$

Display = 59.753

1. $\begin{array}{r} 28.96 \\ 34.35 \\ 19.78 \\ \underline{+21.53} \end{array}$

2. $\begin{array}{r} 758.42 \\ 76.98 \\ \underline{+217.91} \end{array}$

3. $\begin{array}{r} 1479.26 \\ 32.834 \\ 17.983 \\ \underline{+\ 4.06} \end{array}$

4. $\begin{array}{r} 28{,}974.20 \\ 15{,}892.00 \\ \underline{+\ \ 38.55} \end{array}$

5. $\begin{array}{r} 25{,}198.3 \\ 7{,}168.9 \\ \underline{+215{,}897.38} \end{array}$

6. $\begin{array}{r} 39.38 \\ 1.096 \\ 304.96 \\ \underline{+\ 2.1} \end{array}$

7. $\begin{array}{r} 251.9876 \\ 747.489 \\ \underline{+1258.3} \end{array}$

8. $\begin{array}{r} 589.41 \\ 376.974 \\ \underline{+258.441} \end{array}$

9. $\begin{array}{r} 26.8 \\ 49.74 \\ \underline{+\ 3.048} \end{array}$

10. $\begin{array}{r} 3.073 \\ 12.2 \\ \underline{+33.65} \end{array}$

BEGINNING CALCULATORS
UNIT I

ASSIGNMENT SHEET #2--SUBTRACT WHOLE NUMBERS AND DECIMALS

Directions: Work the following problems with a calculator. Round your answers to the nearest hundredth.

Example: $\begin{array}{r} 112 \\ -\ 26 \\ \hline 86 \end{array}$ $\boxed{1}\ \boxed{1}\ \boxed{2}\ \boxed{-}$ $\boxed{2}\ \boxed{6}\ \boxed{=}$ Display 86

1. $\begin{array}{r} 39.37 \\ -25.41 \\ \hline \end{array}$

2. $\begin{array}{r} 12{,}377.01 \\ -1{,}948.79 \\ \hline \end{array}$

3. $\begin{array}{r} 215{,}000 \\ -125{,}000 \\ \hline \end{array}$

4. $\begin{array}{r} 430.840 \\ -\ \ 5.404 \\ \hline \end{array}$

5. $\begin{array}{r} 2.879 \\ -0.825 \\ \hline \end{array}$

6. $\begin{array}{r} 31{,}414 \\ -20{,}703 \\ \hline \end{array}$

7. $\begin{array}{r} 132.9 \\ -64.6 \\ \hline \end{array}$

8. $\begin{array}{r} 89 \\ -45 \\ \hline \end{array}$

9. $\begin{array}{r} 1482.17 \\ -\ 79.99 \\ \hline \end{array}$

10. $\begin{array}{r} 17{,}265 \\ -16{,}113 \\ \hline \end{array}$

BEGINNING CALCULATORS
UNIT I

ASSIGNMENT SHEET #3--MULTIPLY WHOLE NUMBERS AND DECIMALS

Directions: Work the following problems using a calculator. Round your answers to the nearest hundredth.

Example:

$$\begin{array}{r} 14.783 \\ \underline{\times \quad 91} \\ 1345.25 \end{array} \qquad \boxed{1}\ \boxed{4}\ \boxed{.}\ \boxed{7}\ \boxed{8}\ \boxed{3}\ \boxed{\times}\ \boxed{9}\ \boxed{1}\ \boxed{=}$$

1. $\begin{array}{r} 853 \\ \underline{\times 9.63} \end{array}$

2. $\begin{array}{r} 89.7 \\ \underline{\times .63} \end{array}$

3. $\begin{array}{r} 3409 \\ \underline{\times .006} \end{array}$

4. $\begin{array}{r} 41.06 \\ \underline{\times \quad 31} \end{array}$

5. $\begin{array}{r} 32 \\ \underline{\times .076} \end{array}$

6. $\begin{array}{r} 972.3 \\ \underline{\times\ .017} \end{array}$

7. $\begin{array}{r} .7001 \\ \underline{\times\ .95} \end{array}$

8. $\begin{array}{r} 5.47 \\ \underline{\times 99.6} \end{array}$

9. $\begin{array}{r} 1002 \\ \underline{\times\ 8.7} \end{array}$

10. $\begin{array}{r} 973 \\ \underline{\times .97} \end{array}$

BEGINNING CALCULATORS
UNIT I

ASSIGNMENT SHEET #4--DIVIDE WHOLE NUMBERS AND DECIMALS

Directions: Work the following problems with a calculator. Round your answers to the nearest hundredth.

Example: 542.6 ÷ 47 = 11.54

$\boxed{5}\ \boxed{4}\ \boxed{2}\ \boxed{.}\ \boxed{6}\ \boxed{\div}\ \boxed{4}\ \boxed{7}\ \boxed{=}$

1. 95.77 ÷ 6.3 =

2. $\frac{573}{4.7} =$

3. 100 ÷ 26.6 =

4. 1757.7 ÷ 46.5 =

5. $\frac{9225}{25} =$

6. $\frac{36}{42} =$

7. 9963.52 ÷ 389.2 =

8. 475 ÷ 92.6 =

9. $\frac{9483}{12.4} =$

10. 10973 ÷ 4.62 =

BEGINNING CALCULATORS
UNIT I

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. 104.62
2. 1053.31
3. 1534.14
4. 44,904.75
5. 248,264.58
6. 347.54
7. 2257.78
8. 1224.83
9. 79.59
10. 48.92

ASSIGNMENT SHEET #2

1. 13.96
2. 10428.22
3. 90,000
4. 425.44
5. 2.054
6. 10,711
7. 68.3
8. 44
9. 1402.18
10. 1152

ASSIGNMENT SHEET #3

1. 8214.39
2. 56.51
3. 20.45
4. 1272.86
5. 2.43
6. 16.53
7. .67
8. 544.81
9. 8717.40
10. 943.81

ASSIGNMENT SHEET #4

1. 15.20
2. 121.91
3. 3.76
4. 37.80
5. 369
6. .86
7. 25.6
8. 5.13
9. 764.76
10. 2375.11

BEGINNING CALCULATORS
UNIT I

TEST

Directions: Work the following problems using a calculator. Round your answers to the nearest hundredth. Put your answers in the blanks provided.

1. Addition

   a. 45.62 + 1.93 + 14 + 11.983 = ________________

   b. 97 + 103.6 + 901.47 = ________________

   c. 21 + 3.7 + 496.12 = ________________

   d. 2.5 + 16.1 + 900 = ________________

2. Subtraction

   a. 473.5 - 75.62 = ________________

   b. 46.3 - 2.075 = ________________

   c. 19.45 - 11.6 = ________________

   d. 200 - 15.5 = ________________

3. Multiplication

   a. 97.3 x 8.2 = ________________

   b. 29.32 x 103.9 = ________________

   c. .002 x 78.6 = ________________

   d. .00981 x 3574 = ________________

4. Division

   a. 476.3 ÷ 96.2 = ________________

   b. 697.48 ÷ 49.2 = ________________

   c. $\frac{1101.6}{45.3}$ = ________________

   d. 94 ÷ 12.2 = ________________

BEGINNING CALCULATORS
UNIT I

ANSWERS TO TEST

1. a. 73.53 b. 1102.07
   c. 520.82 d. 918.6

2. a. 397.88 b. 44.23
   c. 7.85 d. 184.50

3. a. 797.86 b. 3046.35
   c. .16 d. 35.06

4. a. 4.95 b. 14.18
   c. 24.32 d. 7.70

ADVANCED CALCULATORS
UNIT II

UNIT OBJECTIVE

After completion of this unit, the student should be able to apply calculator skills to solutions of given types of problems. This knowledge will be evidenced by correctly performing the procedures outlined in the assignment sheets and by successfully scoring 85 percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit of instruction, the student will be able to:

1. Solve percentage problems with a calculator.
2. Square a given number with a calculator.
3. Convert common fractions to decimal fractions with a calculator.

ADVANCED CALCULATORS
UNIT II

SUGGESTED ACTIVITIES

I. Provide student with objective sheet.

II. Provide student with information and assignment sheets.

III. Discuss unit and specific objectives.

IV. Discuss information and assignment sheets.

V. Assist students as they work through assignment sheets

VI. Give test.

VII. Evaluate and record test results.

INSTRUCTIONAL MATERIALS

I. Included in the unit:

  A. Objective sheet

  B. Information sheet

  C. Assignment sheets

    1. Assignment Sheet #1--Work percentage problems

    2. Assignment Sheet #2--Work problems involving squaring

    3. Assignment Sheet #3--Change fractions to decimals

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

II. References

  A. BAJPAI, AVI C., Rodney M. Bond and Jerry W. Jones. Applied Math. NY: Packard Publishing, 1983

ADVANCED CALCULATORS
UNIT II

INFORMATION SHEET

I. Working percentage problems

A. Enter the percent.

B. Press the $\boxed{\%}$ key.

C. Press the $\boxed{\times}$ key.

D. Enter the second number (this will be the number that you are "taking the percent of")

E. Press the $\boxed{=}$ key.

F. The answer will be displayed.

(NOTE: This procedure may vary depending on the type of calculator being used. For example, steps D and A may need to be interchanged for some calculators.)

Example: Find 17% of 92. 15.64

$\boxed{1}\ \boxed{7}\ \boxed{\%}\ \boxed{\times}$
$\boxed{9}\ \boxed{2}\ \boxed{=}$

Display
15.64

II. Squaring a number

A. Enter the base number (the number to be squared)

B. To square the number use one of the following:

1. Press the $\boxed{x^2}$ key.
2. Press the $\boxed{y^x}$ key, the $\boxed{2}$ key, and the $\boxed{=}$ key.
3. Press the $\boxed{\times}$ key, and the $\boxed{=}$ key.
4. Press the $\boxed{\times}$ key, repeat step A, then press the $\boxed{=}$ key.

C. The answer will be displayed.

(NOTE: The method you use will depend on the type of calculator being used.)

Example: $(13)^2 = 169$

Display

1. $\boxed{1}\ \boxed{3}\ \boxed{x^2}\ \boxed{=}$ 169

2. $\boxed{1}\ \boxed{3}\ \boxed{y^x}\ \boxed{2}\ \boxed{=}$ 169

3. $\boxed{1}\ \boxed{3}\ \boxed{\times}\ \boxed{=}$ 169

4. $\boxed{1}\ \boxed{3}\ \boxed{\times}\ \boxed{1}\ \boxed{3}\ \boxed{=}$ 169

III. Common fractions to decimals

A. Enter the numerator (the top number) of the common fraction.

B. Press the $\boxed{\div}$ key. (Remember, the fraction bar means division.)

C. Enter the denominator (the bottom number) of the common fraction.

D. Press the $\boxed{=}$ key.

E. The display will be the decimal equivalent of the common fraction.

Example: $\frac{15}{16} = .9375$

$\boxed{1}\ \boxed{5}\ \boxed{\div}$
$\boxed{1}\ \boxed{6}\ \boxed{=}$

ADVANCED CALCULATORS
UNIT II

ASSIGNMENT SHEET #1--PERCENTAGE PROBLEMS

Directions: Work the following problems on a calculator. Round answers to the nearest hundredth.

Example: Find 15% of 98

$\boxed{1}\ \boxed{5}\ \boxed{\%}\ \boxed{\times}\ \boxed{9}\ \boxed{8}\ \boxed{=}$ 14.7

or

$\boxed{9}\ \boxed{8}\ \boxed{\times}\ \boxed{1}\ \boxed{5}\ \boxed{\%}\ \boxed{=}$ 14.7

(NOTE: Use the method that is appropriate for your calculator.)

1. What is 12% of 409?
2. What is 19% of 85?
3. Find 50% of 205
4. Find 250% of 48
5. What is 11% of 62?
6. What is 125% of 188?
7. Find 72% of 56?
8. Find 35% of 70?
9. 96% of 211 is?
10. 14% of 110 is?

ADVANCED CALCULATORS
UNIT II

ASSIGNMENT SHEET #2--SQUARE A GIVEN NUMBER

Directions: Work the following problems on a calculator. Round answers to the nearest hundredth.

Example: $(9,2)^2 = \boxed{9}\ \boxed{.}\ \boxed{2}\ \boxed{x^2}\ \boxed{=}$ 84.64

$= \boxed{9}\ \boxed{.}\ \boxed{2}\ \boxed{y^x}\ \boxed{2}\ \boxed{=}$ 84.64

$= \boxed{9}\ \boxed{.}\ \boxed{2}\ \boxed{\times}\ \boxed{9}\ \boxed{.}\ \boxed{2}\ \boxed{=}$ 84.64

$= \boxed{9}\ \boxed{.}\ \boxed{2}\ \boxed{\times}\ \boxed{=}$ 84.64

(NOTE: Use the method that is appropriate for your calculator.)

1. $(47.3)^2 =$
2. $(11)^2 =$
3. $(.5)^2 =$
4. $(.004)^2 =$
5. $(32)^2 =$
6. $(.097)^2 =$
7. $(16.1)^2 =$
8. $(312)^2 =$
9. $(6.7)^2 =$
10. $(147.2)^2 =$

ADVANCED CALCULATORS
UNIT II

ASSIGNMENT SHEET #3--CHANGE FRACTIONS TO DECIMALS

Directions: Work the following problems on a calculator. Round answers to the nearest ten-thousandth (4 places).

Example: $\frac{3}{4} = \boxed{3}\ \boxed{\div}\ \boxed{4}\ \boxed{=}$ 0.75

1. $\frac{17}{16} =$
2. $\frac{2}{3} =$
3. $\frac{7}{13} =$
4. $\frac{3}{8} =$
5. $\frac{3}{7} =$
6. $\frac{7}{5} =$
7. $\frac{5}{9} =$
8. $\frac{7}{32} =$
9. $\frac{5}{8}$
10. $\frac{4}{5} =$
11. $2\frac{1}{2} =$
12. $4\frac{7}{8} =$
13. $6\frac{1}{3} =$
14. $8\frac{1}{5}$
15. $3\frac{1}{4} =$

ADVANCED CALCULATORS
UNIT II

ANSWERS TO ASSIGNMENT SHEETS

ASSIGNMENT SHEET #1

1. 48
2. 16.15
3. 102.5
4. 120
5. 6.82
6. 235
7. 40.32
8. 24.5
9. 202.56
10. 15.4

ASSIGNMENT SHEET #2

1. 2237.29
2. 121
3. .25
4. .000016
5. 1024
6. .009409
7. 259.21
8. 97344
9. 44.89
10. 21667.84

ASSIGNMENT SHEET #3

1. 1.0625
2. .6667
3. .5384
4. .3750
5. .4286
6. 1.400
7. .5556
8. .2188
9. .6250
10. .8000
11. 2.500
12. 4.8750
13. 6.3333
14. 8.200
15. 3.250

ADVANCED CALCULATORS
UNIT II

TEST

Directions: Solve the following problems using a calculator. Round your answers to hundredths.

1. Percentage

   a. What is 5% of 92? b. 92% of 212 is?

   c. Find 13% of 42. d. What is 20% of 75?

2. Squaring (Round as indicated)

   a. $(32)^2 =$ b. $(9.8)^2 =$ (2 places)

   c. $(.0073)^2 =$ (8 places) d. $(22.4)^2 =$ (2 places)

3. Fractions to decimals (Round to 2 places)

   a. $\frac{15}{16} =$ b. $\frac{1}{9} =$

   c. $\frac{3}{11} =$ d. $\frac{3}{20} =$

ADVANCED CALCULATORS
UNIT II

ANSWERS TO TEST

1. a. 4.6
   b. 195.04
   c. 5.46
   d. 15

2. a. 1024
   b. 96.04
   c. .00005329
   d. 501.76

3. a. .94
   b. .11
   c. .27
   d. .15